The Chemical Age

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Hope Long Deferred . . . . .

ECONOMIC nationalism and the spread of the shadow of Mars over the fair face of the world have perhaps made us all a little mad. The madness, however, has this saving grace that it has provided scope for the chemist and the chemical engineer to make by the laborious toil of many, those products which in more favoured regions are to be had for the picking or are dug by the untutored savage from the prolific earth. Nowhere has the economic madness been more apparent than in the search for home supplies of oil. The chemist has done his work nobly, and much remains for him to do.

It was not long since that a new industry was promised to us—a new chemical industry that would have made this country safe in one respect against economic madness. With a flourish of trumpets men started in many places to search for domestic supplies of oil. The tall derricks reared their heads above the sky-line, the drill probed the very depths of the earth searching ultimately through strata so ancient that not even the mighty mammoth could have trodden them, nor the pterodactyl have seen them when flying aloft in the primeval skies. The discovery of oil would have been of inestimable value to the country; it would have rendered unnecessary the admittedly expensive manufacture of oil from coal, and it would have made our fleets, our mechanised army, our air force and our industries independent of overseas supplies. It would, in short, have removed our Achilles Heel. But alas! our drillers, one by one, are dismantling their derricks, they "fold up their tents like the Arabs, and as silently steal away." Nowhere yet has oil been discovered, and it seems likely at the moment that the great chemical industry that once was hoped to be established here will be denied us.

We are not yet convinced that all hope has departed, because there is reason to believe that the search for oil has not always been conducted upon the best possible advice. There is a divergence of views as to the most promising localities, and to some of us it has seemed that the geologists have been searching for oil in strata that, while having the correct conformation, yet lacked certain essential requirements. It is too early to speak more plainly than this, especially as there is likely to be some public discussion upon the subject during the coming winter.

With the shrinkage of the likelihood of the discovery of home supplies of petroleum it becomes all the more necessary to take positive steps to set up chemical plants for the home production of motor fuel from coal. We have had occasion to comment upon this aspect of the subject upon previous occasions, and we should not revert to it again were it not because of possibly misleading statements that have been published in the official report of the Committee that was appointed in 1934 by the Australian Government to advise upon the economics of establishing a hydrogenation plant in Australia. This Committee has considered low temperature carbonisation, hydrogenation, and the Fischer-Tropsch process. It has announced the conclusion that if interest on capital is charged at $3\frac{1}{2}$ per cent. and fifteen years is allowed for amortisation, the total cost of hydrogenated gasoline from bituminous coal will be 13.8 pence per imperial gallon; if, following the I.C.I. practice, the interest is charged at 6 per cent. and amortisation is effected in ten years, the cost of the gasoline is as high as 17.3 pence per gallon. The operating costs, inclusive of coal at 14s. 6d. a ton, are estimated as 8.4d. per gallon. Admittedly, Australian costs are higher than English costs, but the Committee has calculated that under English conditions the figures for total costs would be respectively 10.5d. and 12.75d. per gallon respectively. Whether these figures are correct or not, we leave I.C.I. to say. To us they appear very high.

We are on firmer ground when dealing with the Fischer-Tropsch process. It has been stated in certain interested quarters that the Committee's report establishes the fact that the capital cost of a Fischer-Tropsch plant is not lower than that of a hydrogenation plant for the same output. The Committee "found" that the cost of building a Fischer-Tropsch plant would be about £100 per ton of output per year, while that for hydrogenation would be only £73 per ton per annum. The estimates we have ourselves had the privilege of examining would show a very different picture for the Fischer-Tropsch plant. We should much like to know upon what basis the Australian figure was determined, and we question whether it was ascertained direct from those who are really in a position to give the actual costs of the many plants that have already been erected in various parts of the world.

The fact is that the investigators state that they were last in Europe in 1936 when only a small experimental Fischer-Tropsch plant was in operation and the investigators admit that it was not possible for them to obtain any costs of operation—or presumably of erection. It would be very unfortunate if the opinions expressed in this report were allowed to influence those who are considering the inception of a chemical industry in this country based on the production of hydrocarbons by the Fischer-Tropsch process. Our own interest in this process arises from the fact that it can be operated in much smaller units than the hydrogenation process, and with a much less highly trained staff. It would be possible to situate these plants throughout the country at collieries possessing coking coal, and thus bring into being another and widespread chemical industry.

Notes and Comments

Criticism of the Young Chemist

THE recently qualified chemist seems doomed to be the butt of an ever-increasing flow of criticism. When the chemist first appeared upon the scene, he was regarded as something in the nature of a wonder, and lent considerable prestige to any works. He was left very much to himself and the results of his labours, good or bad, were rarely questioned. This phase quickly passed, however, and its passing was marked from the time that the chemist left his exalted and slightly mysterious position, acquired by working entirely alone and on matters mainly only known to himself, and commenced work on the plant in close contact with the process workmen. There was then a common basis for comparison; the chemist was promptly weighed in the balance and often found wanting. As soon as the chemist realised that he was being judged solely on the workman's standard of efficiency, an efficiency acquired purely by long practical experience on the plant, the resulting criticism lost much of its point, and although it appears that the youthful chemist will always have to bear with this type of criticism, it causes him little anxiety when he gets used to it. Another standard of values by which the young chemist can be assessed, is that of the chief works chemist and technical director. This is naturally the true standard and it is vital to his career that he should comply with it. Unfortunately this standard is not clearly defined; what is meat to one chief chemist can sometimes be poison to another technical director, but it is said widely that the qualities of the modern young chemist are below par.

His Deficiencies

IN America the same state of affairs seems to exist. *Chemical Industries* has asked a number of plant and research executives in what direction the defiiciencies of the recently graduated chemist lie, and their replies have been published in that journal. A number of these replies stress the point that the younger chemists lack thorough training in the fundamentals of the science, as a result of too early specialisation. On the other hand, it is well known that the industry as a whole is becoming more and more specialised, thus earlier specialisation on that ground seems indicated. It largely rests on finding the happy mean. Fault is found with the lack of power of self-expression, breadth of outlook and other personal characteristics. One writer suggests that these might be corrected in a major degree through courses in public speaking and debating, business correspondence and report writing, economics, accounting and cost-accounting, more liberal arts courses, and better planned reading. After spending some four years learning the "fundamentals" of chemistry, entering industry and acquiring specialised chemical knowledge, excuses can easily be found for the young chemist neglecting to take further courses to improve his personal qualities. The question mainly depends on the number of young chemists available. If the present supply was little more than adequate, there would be little criticism of their mental make-up.

The Trend of Business

LORD McGOWAN, chairman of Imperial Chemical Industries, Ltd., dropped some useful hints to industrialists in a speech which he made at the recent Humber Luncheon held at the Dorchester Hotel. There is always a tendency in good times to advance the price of products and to make as much money as possible. Lord McGowan said that that tendency should be most strenuously resisted, for to do so starts a vicious circle, the consequences of which he felt sure would be disastrous. He was glad to know that in this country we are becoming more and more research-minded and he made an admirable summary of the value of research. Research cannot always be a winner, and for one striking achievement there may be failures on which we have spent money and which have not come up to expectations; research is the price or penalty of success. We must spend money on research to maintain and improve our competitive position throughout the world. Referring to the important question of export trade, Lord McGowan pointed out that this could not be transacted at home; it is only by personal visits that the rapidly changing economics in almost every country in the world can be appreciated. Finally he touched on what might happen after the peak of the Defence programme is reached, a condition of affairs which is giving industry cause for anxiety. He said that in all probability there will be a certain recession of trade when this peak is passed and, so far as his company is concerned, reorganisation is being postponed as far as possible.

Government's Raw Materials Declaration

THE Government has officially approved of the findings of the committee set up by the League of Nations to inquire into the international raw materials position, according to a statement made at Geneva on Tuesday. It is in full agreement with the view of the committee that the difficulties of certain countries were not in regard to the supply of raw materials, but in regard to the payment for them. The committee recommended that no nation should prohibit the export of raw materials or impose exorbitant export duties, amounting to prohibition. The Government declares that this has been, and will be, its policy and welcomes similar declarations from other governments. This is an assurance of great importance and should act as a useful lead to other countries, but, as pointed out in our leader of September 18, considerable coercion will have to be exercised to break down the "what I have I hold" attitude prevailing to-day among the countries possessing valuable raw materials.

Glass Textile Materials

ATTEMPTS have been made periodically in the past to produce a weavable fabric from glass fibres. These attempts have met with little success, but an article in the current number of the Journal of the American Ceramic Society describes a field of application of textile materials made from glass which appears to be most promising. Filter cloths composed of glass fibres of 0.0002 in. diameter have very high filtration ratio and their life, tested under the extremely severe conditions of filtration of 30 per cent. sulphuric acid at 95°, was four times that of cotton cloth. Further, acids seem to increase the tensile strength of the fibres by about 25 per cent. Filtration of any acid solution (except hydrofluoric) is possible, but so far a cloth for the filtration of alkaline liquors has not been produced. Glass wool, in which long glass fibres are roughly twisted together in a mass, is, of course, widely used for filtering media in analytical work and has proved very satisfactory in practice. In this wool the fibres are not spun together to form anything resembling a coherent thread and it is doubtful that the filter cloths described above are woven from threads composed of glass fibres. In all probability the cloths do not have an appearance similar to that of an ordinary textile fabric but are in the nature of coherent tightly twisted masses of glass wool, liable to fray and disintegrate comparatively readily. The main difficulty in the production of glass textile fabrics is that the surface of the glass fibres is so smooth that they do not adhere to each other firmly and cannot be spun satisfactorily. Artificial roughening of the surface has not yet overcome the problem. Tests have been made with glass "yarn" and "tape" for the insulation of cables with very satisfactory results.

Notes on the Fatty Alcohols and their Derivatives

By

A. H. PREVOST

DURING recent years chemistry has developed in a hundred different directions and with each stage of progress there has been a perceptible branching effect. When some discovery is followed by a new industrial undertaking, a new subdivision of technical chemistry is born and quite often a new kind of specialist is brought into being also. While all this specialisation is necessary and perhaps desirable, the effect is to divide and segregate parts of what is one whole continuous subject. It is much more difficult to gain a general idea of the growth of a subject which is so broken up and dissected.

It is all the more necessary, then, to have general reviews made of technical developments in any one field in order to get a good rational perspective of the subject. This need of a general review applies just as much to the specialist in one isolated branch of that industry as to the chemist whose interest lies in some other sphere.

The intention of such an account as this, is to integrate into one whole study, the otherwise isolated units in the field of wetting agents. Since the discovery of the fatty alcohols is one of the milestones in the development of this important new study, the writer has made them the focus and starting point.

The term "fatty alcohol" is by no means a perfect name for the new interesting class of substances. While justifying the name "alcohol," they are a long way removed from methyl, ethyl and propyl alcohols, so widely known and used in commerce. When it is remembered how closely related chemically are acetic acid and ethyl alcohol, it seems curious that palmitic acid and cetyl alcohol bear no close relationship to each other. Yet the process of reduction which changes acetic acid into ethyl alcohol is equally applicable to palmitic acid. Thus by reduction with hydrogen one oxygen is replaced by two hydrogens in the carboxylic group:

$$C_{15}H_{31}COOH + 4H = C_{15}H_{31}.CH_2 + H_2O$$

Palmitic Acid — Cetyl Alcohol.

If lauric acid is treated in the same way, a C_{12} alcohol, lauryl or dodecyl, is obtained.

$$C_{11}H_{23}COOH + 4H = C_{11}H_{23}CH_2OH + H_2O$$

With acetic and propionic acids the same kind of result is obtained.

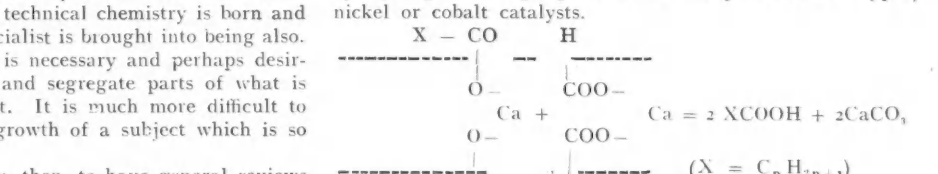
The technical interest in the alcohols is not entirely confined to the alcohol group, but is centred rather in the alcohol radicle. Just as ethyl alcohol may be used to prepare ethylamine $C_2H_5.HH_2$ or ethyl mercaptan $C_2H_5.SH$ with innumerable uses in chemical synthesis, so may the fatty alcohols be used in synthesis as amines, mercaptans and so forth. In the literature of wetting agents frequent mention is made of dodecylamine $C_{12}H_{25}NH_2$ and dodecyl mercaptan $C_{12}H_{25}SH$. Thus it so seems that the term fatty alcohol may be interpreted in a very wide sense and that it is not limited to the use of cetyl or lauryl alcohol, in face creams or for softening rayon, for example.

Although fatty acids have been known for scores of years, it was not until the fatty alcohols were prepared commercially that wetting agents, dispersing and cation-active bodies became possible. In relation to the overall size of the molecule, the change from COOH to CH_2OH is small in proportion.

Preparation of Fatty Alcohols

The technical applicability of these bodies depends to a large extent on the ease and cheapness with which they may be made from the abundant fatty acids. In every method of manufacture it will be seen that reduction by hydrogenation is an essential part.

In one patent a few years ago, Böhme A.-G., of Chemnitz, prepared fatty alcohols by heating together in a solvent the calcium salts of formic acid and higher fatty acids. Simultaneously as the aldehydes were formed they were reduced by hydrogen at high pressure in the presence of copper, nickel or cobalt catalysts.



Calcium Salt. Calcium Formate.

For example, lauryl alcohol was manufactured by calcium formate and calcium laurate being heated together with hydrogen under pressure. Suitable solvents include tetraline, dodecane and certain fatty alcohols

Another way of reducing a fatty carboxylic acid to the corresponding alcohol is to treat the ester, halide or amide of the acid with atomic hydrogen such as is obtained electrically by glow discharge. An apparatus as described by Wood (*Philosophical Magazine*, 1921, *42*, 729) is suitable for so treating ethyl laurate to convert it into lauryl alcohol. Molecular hydrogen is rendered atomic by passage through an arc between electrodes of tungsten, low pressure being maintained.

A leading firm in the U.S.A. have found it possible to prepare fatty alcohols by hydrogenating animal and vegetable oils in the glyceride state. This is an obvious saving of time and materials in contrast with methods requiring calcium soaps to be made first. Naturally the end product will consist of a mixture of alcohols plus secondary products. The hydrogen is applied under a pressure of 100 to 205 atmospheres, a temperature of 300° to 400° C. being maintained. A very vital feature of the process is the catalyst which consists of the mixed chromites of copper, cadmium and zinc. It is interesting to note that the same catalyst may be employed for converting aliphatic esters into the corresponding alcohols, that is by high pressure hydrogenation at raised temperature. The conversion, for example, of ethyl acetate into ethyl alcohol is possible with such a catalyst.

The alcohols obtained from fatty glycerides vary somewhat. Palm oil yields mainly cetyl alcohol, while from coconut oil a mixture of alcohols with 8, 10, 12 or 14 carbon atoms is obtained.

Some Uses of the Fatty Alcohols Themselves

The fatty alcohols are, comparatively speaking, newcomers in commerce and their properties have not yet been fully explored. Cetyl alcohol $C_{16}H_{33}OH$ appears to have interested pharmaceutical chemists and makers of cosmetic specialities. Its presence lends smoothness to a face, hand, shaving cream or lipstick in comparatively small percentages.

It would appear at the present time that rayon manufacture is one of the most promising outlets for the fatty alcohols industrially. Thus, Imperial Chemical Industries, Ltd., now market a mixture of long chain alcohols under a proprietary name in the form of an aqueous emulsion. The product is a white cream which emulsifies readily in water. Applied to rayon, such an emulsion endows it with softness, while in the case of cellulose acetate, alcohols reduce its tendency to become electrically charged in weaving or drying. The fatty alcohols have one very useful quality which appeals to all textile finishers and makers of fabrics, they do not discolour or turn rancid on the goods.

Since the fatty alcohols are practically insoluble in water,

the methods of their application to rayon differ considerably. One suggestion is to mix the alcohol with the solution of cellulose ester prior to spinning and forming the filaments. In this way the softener becomes intimately mixed with the material of the fibre and is to all intents and purposes permanent. It is stated that the feel of such modified filaments is improved thereby. There are great possibilities in the foregoing method of introducing the fatty alcohol prior to formation of the filament and British Celanese, Ltd., have found that it makes textile materials more amenable to dyeing, has a lubricating effect and improves flexibility in the case of films of cellulose derivatives. There seems to be general approval of cetyl and octadecyl alcohols as modifiers by this method. According to a recent Canadian invention cellulose acetate containing 10 per cent. of cetyl alcohol, introduced before spinning, gives a yarn which knits more clearly, dyes 20 per cent. faster and is more readily delustred. Another and entirely different plan for dressing cellulosic materials with fatty alcohols is to displace first the water absorbed in the fibres by treatment with an alcohol such as ethyl, propyl or butyl. Subsequently the material is immersed in an alcoholic solution of the fatty alcohols.

It should be noted that in addition to their use in cosmetic preparations and in rayon finishing, the use of fatty alcohols as super-fatting agents in soap has been patented. No tendency towards rancidity is produced (B.P. 424,283). Fatty alcohols as foam preventers is also the subject of another patent (B.P. 429,423).

The Sulphated Fatty Alcohols

The fatty alcohols are better known in the sulphated form than as the alcohols simply. When fatty alcohols are treated with sulphuric acid at 100° C. or with chlorsulphonic acid in the cold, the – OH group is esterified. The strength of acid used and the conditions obtaining are a matter of great importance. When formed the alcohol-sulphuric acid ester is neutralised with soda before being placed on the market. The sodium salt of lauryl sulphuric ester (plus esters of other alcohols) is a yellowish powder. It dissolves readily in water to give an opalescent, foaming solution. The commercial brands usually contain as much as 50 per cent. sodium sulphate which is considered to act ionically and enhance the detergent effect. Many sulphated fatty alcohol products react slightly acid towards litmus.

It will be obvious that there are possibly as many different alcohol esters as there are different fatty acids. Just as palmitic acid, which is fully saturated, gives cetyl alcohol convertible to cetyl sodium sulphate, so there is an ester corresponding to oleic and other unsaturated acids. Some workers have stated that the sulphates of unsaturated alcohols possess higher detergent power than those of saturated alcohols.

The following directions indicate how the sulphate of olein alcohol may be prepared. 100 parts of olein alcohol are run into 70 to 100 parts of sulphuric acid at a temperature below 6° C. The mixture is allowed to remain for four hours, is neutralised and evaporated in vacuo. The product is a soft soap-like material stable to hard water.

Their Properties and Uses

The properties and advantages of the above over soap and sulphonated oils have been ably summarised by Briscoe.

(a) The sulphated fatty alcohols surpass soap and sulphonated oil in wetting-out, emulsifying and in cleansing;
(b) They are stable towards acids, alkalis and salt;
(c) They do not form alkali by hydrolysis when dissolved in water;
(d) Their lathering powers and "fatty" characteristics are good;
(e) They are not affected by hard water;
(f) They show no tendency to turn rancid on storage.

The power of sulphated fatty alcohols to lather and cleanse in water of almost any hardness is the characteristic which arouses most interest with chemists and technologists. The superiority of such over a substance which forms a useless curdy precipitate with lime and "hardness" salts, *i.e.*, soap, requires no emphasis to make it appreciated. The advantage is not only evident in the saving of waste because no lime soap is precipitated, but of even greater appeal is the fact that articles washed in sulphated fatty alcohols with hard water are cleaner because there is no chance of a curdy lime-soap deposit being left behind. The phenomena of lime-soap deposition is seen most obviously in the case of the washing of fine fabrics, human hair and polished surfaces.

Stability to Acids

Another feature of the sulphated fatty alcohols is their greater inertness towards acids than ordinary soap. While the latter breaks up immediately in the presence of traces of acids, the sulphated fatty alcohols show a much greater tolerance. In fact, solutions of the same not only remain unchanged in the presence of free mineral acid, but are resistant enough to withstand heating also. This feature is of more than theoretical value for there are many occasions when it is desired to bring together in one composition, wetting agents and acids. For example, the use of sulphated fatty alcohols in the nitration of cellulose is the subject of a recent foreign patent. In such a case none but acid-resistant substances would be permissible.

The statement that sulphated fatty alcohols are not affected by lime and hardness-causing salts in water, requires some amplification. It will be recalled that the salt-forming properties of fatty acids are attributed to the presence of a COOH group. This grouping confers but mild strength of acidity and the calcium salts corresponding to most of the C_nH_{2n+1} acids are insoluble in water. If –OH is now substituted for COOH and then converted to the acid sulphuric ester, the same long fatty residue remains, terminated, however, by the acid group $-O-SO_2.OH$. No longer does such an acid behave like a carboxylic acid; calcium salts do not precipitate it immediately. The calcium salt of this acid ester possesses sufficient solubility in water to make it impossible for such small proportions of lime, as usually occur in hard water, to be precipitated.

By the comparatively simple change from COOH to $O.SO_2OH$ there is created a new detergent with hundreds of new uses and technical possibilities. The new discovery was made known to the textile industry as soon as any. Commercial sulphated fatty alcohols have proved useful in both washing and in dyeing. Solutions of this body may be used very advantageously for washing all kinds of textile materials in either hard water or soft. When goods are so washed they may, if desired, be transferred immediately to the dye-bath. The presence of such compounds does not interfere with the dyeing process; as a general rule it tends to make the colour spread more evenly. Dyers of woollen material frequently use acid baths containing oil of vitriol. If fabrics containing an appreciable residue of soap are dipped into such a bath, decomposition takes place and the liberated free fatty acid may seriously interfere causing an uneven dyeing. No such danger exists where sulphated fatty alcohols are used even where the residue left in the textile material is quite large.

Detergent Power

The high detergent power of the sulphated fatty alcohols and their freedom from after-smells make them interesting to the hair shampoo and cosmetic maker. Their high lathering qualities, emulsifying and cleansing powers are eminently satisfactory. They may be mixed with either acid or alkaline ingredients as desired. Since first introduced to the toilet speciality trade a few years ago, "soapless shampoos" are already well known in most households and beauty parlours. The sulphated fatty alcohols have also attributes attractive to the maker of dentifrices and tooth powders. General

formulæ for such preparations where these substances are mentioned have appeared recently in the literature.

The extent to which the use of sulphated fatty alcohols has become recognised as suitable for the hair and animal fibres may perhaps be judged from the patent to Imperial Chemical Industries, Ltd., Piggott and Speakman (B.P. 443.359). The following composition is recommended for improving the amenability of wool and hair to setting.

Cetyl sodium sulphate	50	parts by weight.
Sodium sulphate	40	,, ,, ,,
Borax	40	,, ,, ,,

5 pounds is dissolved in 100 gallons of water.

These interesting compounds have been applied to several curious and unexpected uses. Adhesive compositions in a dry powdered form may be prepared from a mixture of cold water-soluble starch and a sulphated fatty alcohol. A patent of Henkel et Cie, of Germany, suggests 100 parts by weight of such starch mixed with 2 parts of the sodium sulphuric esters of octyl, decyl, dodecyl, tetradecyl and cetyl alcohols. A formula for an adhesive which comprises rubber latex and sodium dodecyl sulphate is given in Canadian Patent 355,887. The Deutsche Hydrierwerke A.-G. also have a patent in which the use of sulphated alcohols in adhesives is proposed.

The soaking of silk to soften the sericin without removing it, is a sphere in which sulphated fatty alcohols have been applied (B.P. 439,639). The employment of the same as wetting agents in fire extinguishing mixtures is another instance of the wide applicability of the compounds.

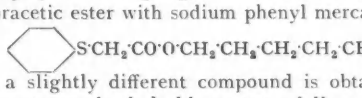
Other Interesting Derivatives

The sulphuric ester is not the only useful type of fatty alcohol derivative known, although at the present time it is undoubtedly the most common. A fatty alcohol or mixture of alcohols may be esterified in a number of ways, for example, with pyrophosphoric acid. According to H. Th. Böhme A.-G., such esters possess better washing properties than the corresponding sulphates. Another alternative is the thiosulphuric ester, proposed by Henkel et Cie. Dodecyl thiosulphuric ester is suitable for the washing of cotton but may also be used as a foaming, impregnating, stabilising or equalising agent or as a soap substitute.

The treatment of a fatty alcohol with chlorine has the effect of lowering the melting point while subsequent sulphation of the chlorinated alcohol gives a sulphuric ester whose solubility is increased without at the same time impairing the wetting power. Naturally, only saturated fatty alcohols are referred to. For example, cetyl alcohol takes up chlorine when treated with the gas in carbon tetrachloride. If the latter solvent is removed and the chlorinated fatty alcohol be sulphonated, a useful wetting and cleansing agent is obtained. For example, it may be employed in pulling wool, washing soiled white textile goods, sizing worsted warps and cotton in conjunction with starch, for dressing and finishing, and in connection with blacking and dyeing.

Fatty Alcohol Mercaptans

The fatty alcohol mercaptans have proved a fruitful field of technical research and so many interesting compounds containing carbon direct linked to sulphur have been discovered, that the subject has become a study on its own. For example, a wetting agent is obtained by treating dodecyl chloracetic ester with sodium phenyl mercaptan:



Or, a slightly different compound is obtained from dodecyl mercaptan and ethyl chloracetate, followed by saponification, probably, $CH_3 \ldots\ldots CH_2.S.CH_2.COONa$. This product possesses saponaceous and emulsifying properties and is of application in the pharmaceutical and rubber industries. Dodecyl mercaptan may be obtained from dodecyl bromide and sodium hydrosulphide.

The I. G. Farbenindustrie A.-G. have a very comprehensive patent covering the manufacture of wetting, washing, vulcanising, and cosmetic compounds from fatty alcohol mercaptans. Thus when dodecyl mercaptan is treated with five molecular proportions of ethylene oxide, a product of probable formula,

$CH_3.CH_2 \ldots S.CH_2.CH_2.O.(CH_2.CH_2.O).CH_2.CH_2.OH$,

is produced. This compound has emulsifying and washing properties. On sulphonation it yields a useful wetting and dispersing agent. By condensing decyl mercaptan, epichlorhydrin and ethylene oxide, a substance useful in preparing creams and ointments is obtained.

Damage to British Interests in China

Traders Call for Compensation

REPRESENTATIVES of leading British industrial interests owning property or having important interests in China, attended a meeting, convened by the Federation of British Industries in conjunction with the China Association, at the offices of the Federation of British Industries on September 29. Sir George Macdonogh, a past-president of the Federation and chairman of the F.B.I. China Committee, was in the chair.

The meeting was notified of information contained in a cable from the F.B.I.'s representative in Shanghai to the effect that material losses, owing to fire, shelling and looting, were large, but that it was impossible to give even an approximate estimate at the present moment as assessors were unable to visit all the districts concerned, and could not enter merchants' wharves which are occupied by the Japanese. Potential losses due to trade restrictions would be even more serious to British interests.

The meeting passed the following resolution for submission to the Government:—"That this joint meeting of representatives of the Federation of British Industries, the China Association and the Bradford, London and Manchester Chambers of Commerce urges upon H.M. Government the vital necessity, in the interests of future British trade with China, of taking all possible steps to prevent further damage to, and further encroachment on, British interests in Shanghai and elsewhere in China, of putting an end at the earliest possible moment to the encroachments which have already taken place, and of securing the restoration and maintenance of normal trading facilities and security, with a view to avoiding further serious consequential losses to British interests."

It was the opinion of the meeting that all claims, both for physical and consequential damages, should be registered on the spot by Consular Officers. It was also unanimously decided that the fullest compensation should be obtained for all damage and losses suffered by British interests.

The meeting was attended by representatives of Manchester Chamber of Commerce, Allen (Edgar) and Co., Ltd., Asiatic Petroleum Co., Bleachers' Association, British Glues and Chemicals, Ltd., Babcock and Wilcox, Ltd., Dorman Long and Co., Dunlop Rubber Co., Ltd., Federation of Calico Printers, Imperial Chemical Industries, Ltd., Lever Bros., Nestle's Milk Products, Pilkington Bros., Pinchin Johnson and Co., Ltd., and Stewarts and Lloyds, Ltd.

Reduction in China's Adverse Trade Balance

United Kingdom's Steady Share in the Country's Imports

A STRIKING feature of the value of the total import and export trade of China is the reduction in the adverse balance of visible trade in the last five years, from $1,087 millions in 1931 to $235 millions in 1936, states the report on the economic and commercial conditions in China from April, 1935, to March, 1937, published for the D.O.T. by H.M. Stationery Office (1s. 3d.). This report was written before the outbreak of the present disturbances in China, under conditions which did not point to an imminent dislocation of trading conditions. The period discussed marked the change from depression to a revival of prosperity. The decline in the import trade, due in part to the heavy incidence of customs duties and increased smuggling, but mainly to local factory production and to depressed conditions in China, was arrested in 1936, and the trade is now showing signs of revival.

In imports of the semi and fully manufactured groups the shares of the principal countries of supply are :—

United Kingdom	17 per cent.
Japan	21 ,, ,,
United States	16 ,, ,,
Germany	21 ,, ,,

Handicaps of U.K. Trade

It is said that the United Kingdom export trade to China is handicapped by :—

(i) Insufficient technical salesmen to work up-country as well as in the main ports.

(ii) In many cases inability to compete in price, possibly because the quality offered is higher than the market demands, or because the demand in the home market is too small to enable the products to be mass-produced.

(iii) In some cases failure of the manufacturer to give sufficient powers to his representative in China to bargain without constant reference to London.

(iv) The inability of British merchants, and/or British manufacturers, to assume all the financial obligations entailed in giving extended credit terms and the inadequacy of the security (often only the enterprise itself) which frequently prevents commercial banks from assuming the financial risk.

The share taken (about 11½ per cent.) by the United Kingdom of the import trade into China has not varied much in the last four years and is a considerable improvement on the share taken in the years immediately preceding 1932. The value of the total imports into China of chemicals and pharmaceuticals was 51,840 (thousands of dollars) of which 7,659 (thousands of dollars), namely, 14 per cent., came from the United Kingdom. The value of the total imports of dyes, pigments, paints and varnishes was 41,193 thousands of dollars, of which 3,167, namely, 7 per cent., was from the United Kingdom.

The following table shows the position of the United Kingdom and other chief countries of supply of chemicals and pharmaceuticals :—

	1934.	1935.	1936.	1936 (First quarter).	1937 (First quarter).
Total Imports ... (thousands of dollars).	41,594	37,443	51,840	10,168	13,420
Of which from :					
United Kingdom.	22%	21%	14%	14%	16%
Germany ...	27%	32%	40%	41%	36%
Japan	20%	22%	21%	23%	23%
U.S.A.	10%	9%	8%	8%	11%

The most important item under this head is sulphate of ammonia, imports of which were valued at over $14 million in 1936, principally from Germany and the United Kingdom. Other leading items are bleaching powder, chlorate of potash, soda ash and caustic soda.

The position in dyes, pigments, paints, and varnishes is as follows :—

	1934.	1935.	1936.	1936 (First quarter).	1937 (First quarter).
Total Imports ... (thousands of dollars).	38,873	37,612	41,193	13,377	12,401
Of which from :					
United Kingdom.	7%	8%	8%	7%	7%
Germany ...	48%	47%	48%	54%	47%
U.S.A.	20%	18%	19%	19%	20%
Japan	12%	14%	12%	10%	11%

Importations of ready mixed paints are decreasing as a result of local productions. Imports of aniline dyes and miscellaneous coal tar dyes increased in value from $10.5 million in 1935 to $14.9 million in 1936, the German share being approximately 70 per cent. of the total. Imports of artificial indigo were valued at $12.7 millions in 1936 against $13.9 million in 1935. Imports of varnishes and miscellaneous paint, polishes, paint materials, and pigments increased in value from $4 million in 1935 to $4.5 million in 1936, but decreased in volume. The use of dyes is increasing in China, for consumption by the growing cotton and woollen industries, and there is a tendency to purchase better qualities of "fast" dyes in place of the previous cheaper qualities. Local production of paints and of some other items under this general heading—*e.g.*, sulphur black—is steadily increasing, and in paints the market is still predominantly a price market, though the products of a large British paint factory recently established in Shanghai compare favourably with imported qualities.

China's Industrial Progress

One of the most—if not *the* most—noteworthy features in China to-day is the progress of industrialisation. China is still primarily an agricultural country, but gives promise of becoming in course of time an industrialised nation capable not only of supplying much of her own requirements of everyday commodities and of "capital" goods, but also of exporting to other countries manufactures produced from her own and imported raw materials. The paint industry continues to make progress. Whilst only two new factories were established during the period under review (one of them British) a general improvement in the quality and increase in the output and range of the products is noticeable. It is now estimated that well over 1,000 tons of various types of paint preparations are now being manufactured locally per month. The local demand for this commodity is increasing, but not as fast as the industry is developing, with the result that foreign imports, except for very specialised products, are being steadily displaced by local manufactures, which are on an average from 10 per cent. to 30 per cent. cheaper. Many of the more important paint ingredients, such as vegetable oils, are available in China.

The leading recent development in the chemical industry is the completion of the synthetic nitrogen factory near Nanking early in 1937, the maximum output of which will be about 50,000 tons of sulphate of ammonia annually. There has also been a steady expansion of alkali production, and China now produces over half of her requirements of alkalis. Two sulphuric acid plants and two electro-chemical plants in Shanghai supply a large proportion of China's consumption of sulphuric, nitric, and hydrochloric acids. Simple dyestuffs (*e.g.* sulphur black) are likewise now being manufactured in China, though as yet only in comparatively small quantities.

THE HOLLANDSCHE SODAFABRIEK recently announced that it has been producing soda ash for the past two years. The manufacture of bicarbonate mainly for export to European countries was inaugurated recently.

Hydrogenation-Cracking of Tars

The Effect of Variables in a Continuous Plant

THE hydrogenation-cracking process by which tars and tar oils may be converted into lower-boiling products, mainly hydrocarbon in nature, by treatment with hydrogen under high pressures and at elevated temperatures has been under investigation at the Fuel Research Station for a number of years, and a series of reports has been published to give an account of the course of the work and of the results achieved. A report entitled, " The Hydrogenation-Cracking of Tars, Part III.—The Effect of Certain Variables in a Continuous Plant " has now been issued by the Department of Scientific and Industrial Research (Stationery Office, 1s.).

The present report deals with the effect of a number of variable factors on the working of a continuous hydrogenation-cracking plant. The possible variables in such a plant are the concentration of the catalyst on the support, the size of the catalyst granules, the nature of the raw material, the temperature, the pressure, the time of contact, and the relative concentrations of tar and hydrogen. In studying these, each factor was varied independently of the other, and attention was paid chiefly to their effect on the activity of the catalyst, which was measured by the degree of conversion of the tar to spirit. Since the activity of the catalyst is not constant, but falls slowly as hydrogenation-cracking proceeds, it is important to choose conditions which not only give a high initial degree of conversion, but which cause the least possible reduction in the activity of the catalyst as the conversion proceeds.

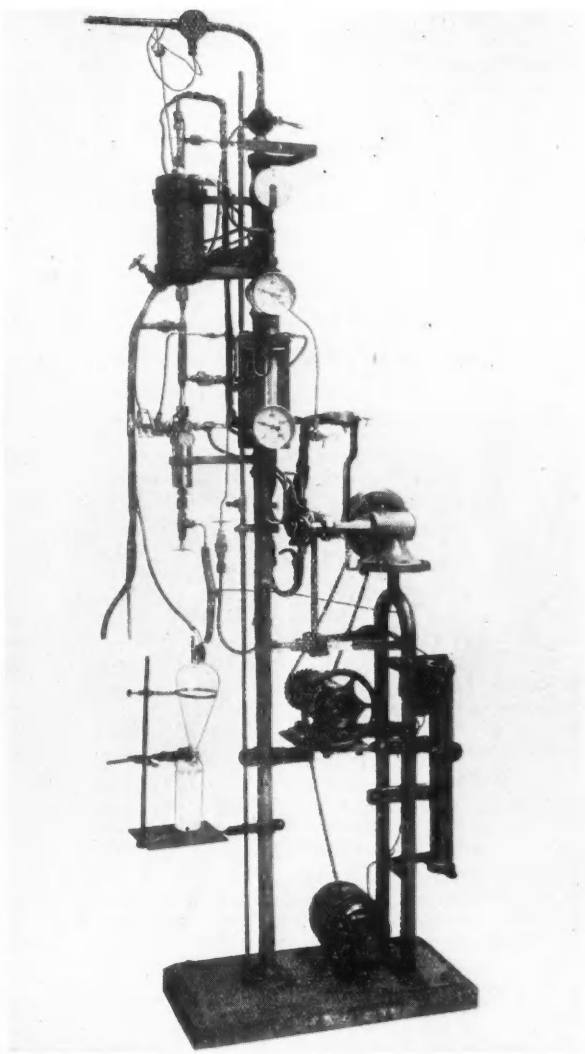
Results of the Experiments

While economic as well as technical considerations will play a part in fixing such conditions in the working of a commercial plant, it is evident that a knowledge of the effects of the variables mentioned is necessary in determining the optimum working conditions. The results of the experiments show that the initial activity and rate of deterioration of the catalyst are not necessarily, or even usually, affected in the same manner or to the same degree by changes in a particular variable. For instance, within certain limits a rise in temperature of the reacting materials produces initially a marked increase in the yield of spirit, but this is offset to some extent by the rapid deterioration of the catalyst. The temperature should therefore be chosen so as to give a maximum yield of spirit over a given period of time. On the other hand, an increase of pressure, while producing only a slight improvement in the initial yield, greatly reduces the rate of deterioration of the catalyst, so that good yields are maintained over a longer period. Similar considerations, it is shown, apply to changes in the other variables.

As measured by the initial specific gravity of the liquid product or the initial spirit yield, the initial degree of conversion (*a*) increases with increase in the amount of molybdenum in the alumina gel up to a concentration equivalent to 15 per cent. of ammonium molybdate; (*b*) is independent of the size of catalyst granules; (*c*) increases when the catalyst is preheated in air at 500° C.; (*d*) decreases when the catalyst is preheated in hydrogen at 200 atmospheres pressure up to a temperature of 400° C.; (*e*) increases rapidly with rise in temperature; (*f*) increases slightly with rise in pressure; (*g*) increases as the ratio of hydrogen to tar increases up to a molecular ratio (at 200 atmospheres) of about 40 : 1, above which the ratio seems to have little effect; the optimum ratio of hydrogen to tar is higher at higher pressures; (*h*) decreases slightly as the throughput is raised, the decrease being less at lower temperatures.

As measured by the rate of increase of the specific gravity of the liquid product, or the rate of decrease of the spirit yield, the rate of deterioration of the catalyst (*a*) decreases with increase in the amount of molybdenum in the alumina gel; (*b*) decreases as the size of the catalyst granules is reduced; (*c*) increases when the catalyst is preheated in air at 500° C.; (*d*) decreases when the catalyst is preheated in hydrogen at 200 atmosphere pressure up to a temperature of 400° C.; (*e*) increases rapidly with rise in temperature; (*f*) decreases rapidly with rise in pressure; (*g*) increases slightly as the ratio of hydrogen to tar increases; (*h*) decreases, when calculated on the basis of unit volume of raw material, as the throughput is raised.

The experiments described in the report were carried out in two small-scale plants, one having a throughput of 200 ml. of tar or tar oil per hour, and the other a throughput of 12 ml. per hour. The experience gained, it is stated, has proved of value in the design and operation of a semi-technical-scale plant capable of treating from 200 to 400 gallons of tar per day.



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One of the small-scale plants used. This has a normal throughput of 12 ml. of oil per hour. In principle, tar and hydrogen at the required pressure are passed downwards through a bed of catalyst, which is maintained at the required temperature.

New Technical Books

ORGANIC CHEMISTRY. By Frank C. Whitmore. pp. 1,080. Chapman and Hall, Ltd. 40s.

This one-volume "Beilstein" has been written jointly for practising organic chemists and for those who have to take occasional notice of organic compounds and their reactions. It is also suitable for students who have already studied organic chemistry for a full year. Every effort has been made to give a text of advanced character, and practically all available sources of information have been drawn upon, including similar "one-volume" texts of advanced nature in German, French and Italian. The author is research professor of organic chemistry at the Pennsylvania State College, and he is president-elect of the American Chemical Society. The writing of the book has taken eight years; its completeness may be gauged from the fact that the index occupies 122 pages (one-ninth part of the complete book) and that those responsible for the index had the arduous task of sorting 49,000 index slips! In keeping with the present trend towards aliphatic chemistry, especially in British and American industry, nearly three-quarters of the book is devoted to aliphatic and alicyclic chemistry; the section on aromatic chemistry is shorter than usual by comparison with other works, but more space is devoted to heterocyclic compounds (5 and 6 membered rings and alkaloids). Complex alkaloids are presented in an orderly arrangement based on an analysis and classification of possible combinations of nitrogen-ring systems. Methods of preparation, properties and reactions are given for every recognised class of organic compound and for several thousand individual substances; here emphasis is laid upon the practical usefulness of reactions, with a consideration of not only what the products are, but whether the yield is good enough to be practical, and how this yield varies with related compounds. In cases where there are omissions in the text—as in the case of some of the hormones—references are given to suitable sources of detailed information. In general throughout the text, the names of investigators and date are given in place of full references, and with a saving in space and the monotonous sequence of many references it provides a serviceable clue to further details by the aid of ordinary indexes of the chemical literature. A deliberate attempt has also been made to explode the fallacy of the homologous series (common in many text books) in which it is often assumed that a knowledge of the first two or three members of a series will furnish a satisfactory knowledge of the series itself. For instance, in the alcohol series it has been found necessary to go to the seven-carbon member before distinct novelties in properties and reactions cease to appear. A lack of consistency in detail of nomenclature is excused on the basis of the lack of uniformity in usage among organic chemists.

GAS BURNERS FOR INDUSTRIAL PURPOSES. (Industriegasbrenner und zugehörige Einrichtungen). By Erich Sachs. Halle (Saale): Verlag von Wilhelm Knapp.

The importance of heating for very many chemical processes makes this book highly interesting. All the different principles are described in great detail, but the author does not mention the various burners for all these principles. The book refers more to German designs than to British ones. In spite of this fact, however, the principles are described very completely and the book can be highly recommended.

THORPE'S DICTIONARY OF APPLIED CHEMISTRY. By Jocelyn Field Thorpe and M. A. Whiteley, assisted by eminent contributors. Fourth Edition. Vol. 1. Pp. 703. London: Longmans, Green and Co. 63s.

The great changes which have occurred since the publication of the original edition of Thorpe's Dictionary have now rendered it necessary to commence a new edition of which Vol. I has just been published. In the future it is proposed to issue one volume a year, and it is hoped that the work will be completed in nine volumes, with index and glossary. The supplementary volumes to the existing edition which appeared in 1934 and 1935 were not true supplements, but rather a collection of monographs on special subjects in which striking advances had been made; they were, in a sense, self-contained, although dependent on the existing edition for continuity. The final volume of the last edition was published in 1927, and the supplementary volumes were really intended to tide over a period during which a new edition of the complete work was being prepared. A comparison of the present volume of the new edition with the corresponding volume in the last edition will show that experts have been asked to write the special articles dealing with their subjects. The editors state that they have realised that the day of the universalist is past and that the work in any special field must be described by an expert who is thoroughly acquainted with his subject. At the same time remembering that specialists in branches of science other than chemistry frequently desire to know what is being accomplished in the development of subjects other than their own, the editors have also done their best to provide for the needs of the ordinarily cultured reader. The new edition, moreover, has been planned to embody the monographical aspect present in the supplementary volumes as well as the dictionary style of the last complete edition. The publication of the work over a prolonged period means that a slightly modified system has had to be introduced so as to avoid giving the earlier volumes reference to volumes which may not appear for some years. In order to ensure this, each volume will be used as a means of bringing a previous volume up to date, *i.e.*, each item of importance contained in a general article in an earlier volume will be dealt with in a later volume under its own initial letter, and any up-to-date additions included. In a similar manner earlier volumes will contain items of importance dealt with in general articles in later volumes, and in this case such items will be brought up to date in the later volume. The binding of the new edition of the dictionary is coloured with Monastral Fast Blue BS, and a note upon the discovery of this well-known I.C.I. product is given upon a leaf which follows the title page.

FINE-GRINDING IN PEBBLE MILLS. (Feinmahlung in Kugelmühlen). By Dr.-Ing. D. Steiner. Berlin: Chemisches Laboratorium für Tonindustrie und Tonindustrie-Zeitung, Prof. Dr. H. Seger and E. Cramer Kom.Ges.

The overwhelming importance of fine-grinding in so many different industries is the reason for publishing a small, but most interesting and well-written book on this subject. The Germans have already published work in this connection, but it is worth while to study the present volume because it describes the position in the different fine-grinding processes on the Continent.

SYSTEMATIC ORGANIC CHEMISTRY. By William M. Cumming, I. Vance Hopper and T. Sherlock Wheeler. Third Edition. Pp. 547. London: Constable and Co., Ltd. 25s.

The third edition of this book appears during a transition stage in the development of organic analysis, when the older macro-methods are gradually giving place to micro- and hemimacro methods, which are more accessible to the average student. The main plan of the book, however, has not been altered; sections have been brought up to date by the addition of improved methods and new references, particularly to "organic syntheses." With the development of large industrial research organisations there is a growing tendency to record new advances through the medium of patent literature. In consequence of this, frequent reference has been made to this source of information, especially as regards high pressure

reactions. The third edition still retains a distinctive feature of the earlier editions, namely, the systematic classification of organic reactions; it has been this feature which has made the book so useful as a complementary to the purely theoretical text-book. Practically every type of reaction is illustrated by at least one preparation, and the comprehensive and up-to-date character of the references should make special appeal to the advanced student and research worker.

INDUSTRIAL CHEMISTRY. By Emil Raymond Riegel. Third Edition. Pp. 851. New York: Reinhold Publishing Corporation. London: Chapman and Hall, Ltd. 28s. 6d.

In the short span of four years which separates the present edition from the previous one, a number of front rank topics in the chemical world have been pushed into second place by newer ones. For instance, the science of cracking petroleum fractions for gasoline is now an integral part of refinery practice; the new science is the purification of lube fractions by solvent extraction, and a still newer one in the same field is the manufacture of gasoline from waste refinery gases and from natural gas by polymerisation, preceded, if need be, by pyrolysis. In other fields, the inventiveness of the chemical engineer and the chemist, driven frequently by necessity, has provided ammoniated superphosphates, sodium nitrate in pellet form, edible sugar from wood cellulose, new solvents in the guise of chlorinated hydrocarbons, dyes for acetate silk, and synthetic rubbers. New uses for standard products are exemplified by the use of rayon cord for automobile tyres, and by regenerated cellulose for sponges. Less sensational but no less essential to the orderly progress of the industries are such improvements as the addition of columbium to stainless steels in order to preserve their corrosion resistance even though heated; the addition of indium to silver to make it non-tarnishing; the sodium phenolate gas washing process for the removal and recovery of sulphur. All these newer developments have been considered in revising the text of the book for the present edition, but at the same time there has been no neglect of the standard or basic features of the various industries which are considered. A greater number of production statistics, either in units of weight or in money value, has also been included. As in the case of previous editions the "reading references" at the end of each chapter are taken almost exclusively from American sources; there is no indication of this having been intentional, but the completeness of the picture has suffered in consequence of the omission of more than a few outstanding references to British and continental journals.

COLLOID CHEMISTRY: PRINCIPLES AND APPLICATIONS. By Jerome Alexander. Fourth Edition. pp. 505. London: Chapman and Hall, Ltd. 22s.

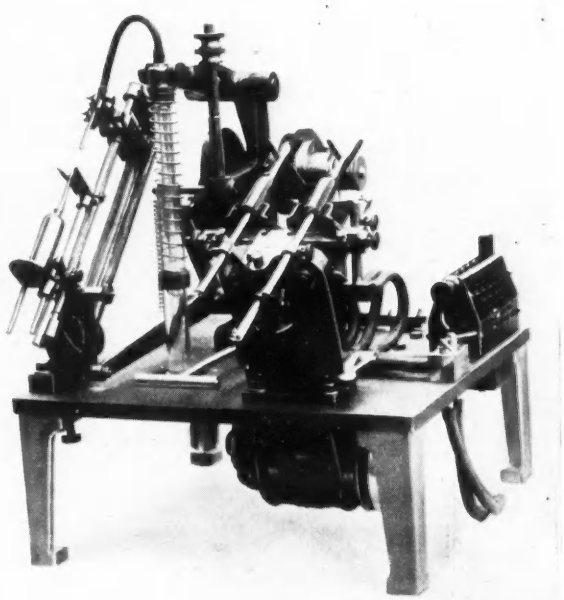
In preparing this greatly enlarged fourth edition, the author has adhered to the principles which governed the preparation of its predecessors. He has assembled experimental data into naturally co-ordinated and interlocking groups, to form a broad mosaic which gives a coherent picture of nature; and has also endeavoured to break down the artificial mental barriers arising from scientific specialisation. Observable facts are stressed, theoretical considerations being incidentally invoked so that the facts may be better co-ordinated and their import understood, because as Liebig once remarked to Wöhler, "there was no lack of experiments and facts, but in understanding what they mean." To make the book more useful as an adjunct to teaching, the contents have been rearranged coherently along the lines of a text. An attempt is made to humanise the bare skeleton of scientific principles by using numerous practical illustrations, so that interest may aid memory, and knowledge may be more easily acquired. The book should, therefore, appeal to the student, and, even with its few mathematical expositions, also to the general reader. To those interested in biology and medicine, it offers a preliminary glance into many borderline fields.

New Water-Repellent Textile Finish

Exhibition of I.C.I. Discovery

AN entirely new textile finish called "Velan PF," discovered in the laboratories of Imperial Chemical Industries, Ltd., will be shown to the textile, furnishing and fashion trades at an exhibition at Dorland Hall, Lower Regent Street, London, October 5-8.

"Velan" is the first finishing agent conferring upon materials water repellency which is permanent to washing, laundering and dry-cleaning. This water-repellent property is obtained by a chemical change in the nature of the silk, rayon, wool, cotton or linen, and it also enhances the softness and suppleness of textile materials. Combining these qualities, it may well revolutionise the technique and scope of textile proofing. At the exhibition the simplicity of the velanising process will be demonstrated. Visitors will be able to examine velanised materials that have been submitted to repeated washing, laundering or dry-cleaning. Velanised materials hang and drape well, make up easily, and quickly recover from the effects of wear.



The Mikrorota ampoule filling and sealing machine shown by Johnsen and Jorgensen Flint Glass Ltd., at the Chemist's Exhibition last week. The machine is driven by a small fractional horse-power electric motor. The burners require town gas and compressed air. The salient features of the machine are: the exact dosage delivered by the pump into each ampoule, the wide range of sizes handled (1 to 10 cc.), the speed obtainable and the ease with which the machine may be changed from one size of ampoule to another.

EXAMINATION of the fatty acids of cohune nut fat, a product of the nut of the cohune palm which grows very abundantly in British Honduras, shows their composition to be closely similar to those for the fatty acids of coconut oil and not very different (except in the content of caprylic, capric and oleic acids) from the corresponding data for palm kernel oil acids. The outstanding features in analysis are the presence of 45-50 per cent. of combined lauric acid, about 15-18 per cent. of combined myristic acid, about 5-10 per cent. of combined oleic acid, and 6 to 14 per cent. caprylic and capric.

Key Industry Duty

Proposed Renewal of Exemptions

THE question of the renewal of the Safeguarding of Industries (Exemption) No. 10 Order, 1936, No. 11 Order, 1936, No. 12 Order, 1936, No. 1 Order, 1937, No. 2 Order, 1937, No. 3 Order, 1937, No. 4 Order, 1937, No. 5 Order, 1937, No. 6 Order, 1937, and No. 7 Order, 1937, made under Section 10(5) of the Finance Act, 1936, is now under consideration by the Board of Trade. The articles covered by the Orders which exempt them from Key Industry duty until December 31, 1937, are:—

Compounds of rare earth metals: Celtium oxide, dysprosium oxide, erbium oxide, europium oxide, gadolinium oxide, holmium oxide, lutecium oxide, samarium oxide, scandium compounds, terbium oxide, thulium oxide, ytterbium oxide, and yttrium oxide.

Synthetic organic chemicals, analytical reagents, other fine chemicals and chemicals manufactured by fermentation processes: Acetamidosalol (acetylamido phenol salicylate), acid adipinic, acid dipropyl-malonic, acid filicic, acid propionic, acyl derivatives of urea, acid isobutyl allyl barbituric, acid isopropyl barbituric, N-methyl-C-C-cyclohexenyl methyl malonyl urea, N-methyl-C-C-cyclohexenyl methyl malonyl urea-sodium, N-methyl ethyl phenyl malonyl urea, cyclohexenyl ethyl malonyl urea, sodium ethyl methyl butyl barbiturate, alcohol amido ethyl, allyl paracetaminophenol, amido guanidine sulphate, amidopyrin (dimethylamido-antipyrine), amidopyrin-barbitone, ammonium perchlorate.

Barbitone (veronal, malonal, malourea, acid diethyl barbituric, diethylmalonylurea, hypnogen, deba), betain hydrochlorate, bromural (dormigene), butyl esters (butyl methyl adipate).

Calcium gluconate (calcium glyconate), calcium monoiodo behenate, cellulose ethers (ethyl cellulose, methyl cellulose), chinoline (quinoline), cocaine, crude cumenol pseudo cyclohexanol esters and alkyl cyclohexanol esters (methyl cyclohexanol methyl adipate).

Dial (acid diallyl barbituric), dicyandiamide, didial (ethyl morphine diallyl barbiturate), *p*-diethoxy ethenyl diphenyl-amidine and its hydrochloride, dimethyl sulphate, diphenyl, diphenyl oxide.

Elbon (cinnamoyl para oxyphenyl urea), ethyl esters (ethyl abietate), ethylene bromide, eukodal, furfurol, germanium oxide, glyceryl (including diglyceryl and triglyceryl), esters (excluding natural oils and fats, synthetic resins and ester gums, but including diglyceryl tetra acetate), glycol ethers, kryofin.

Lead tetraethyl, lipoiodin, menthyl esters (menthyl ethyl glycollate), mercury compounds other than mercuric oxide and mercuric sulphide (N-oxy-aceto-mercuric-propyl-ethyl urethane), metaldehyde, methyl amidoxybenzoate, methyl anthranilate, methyl esters (oxymethyl para-oxphenyl benzylamine methyl sulphate), methyl sulphonal (diethysulphone-methyl-ethylmethane, trional), methylene choride, nickel hydroxide.

Organo-arsenic compounds (copper methyl arsenate, 4-oxy-3 ethyl amino phenyl arsinic acid-n-methyl tetrahydro pyridine B-carboxylic acid methyl ester).

Phenetidine, para-phenetidyl-phenacetin and its hydrochloride, phenol (synthetic) [acid carbolic (synthetic), benzophenol (synthetic)], phenyl guanidine and other substitution derivatives of guanidine, and compounds thereof (decamethylene diguanidine dihydrochloride, dodeca methyl diguanidine hydrochloride, phloroglucine, phytin), piperazine (diethylene-diamine, dispermine) potassium ethylxanthogenate (potassium xanthogenate), potassium guaiacol sulphonate, R. potassium hydroxide (R. potassium caustic, R. potassium hydrate), pyridine distilling not less than 90 per cent. between 113° and 117° C., quinine ethyl-carbonate, radium componds.

Safrol, salol (phenyl salicylate), sodium phenyl dimethyl pyrazolone amino methane sulphonate, sulphonal, theophylline, valeryl diethylamide, veratrine, vanadium compounds

(Continued at foot of next column.)

(vanadium silica compounds specially prepared for use as catalysts for sulphuric acid manufacture).

Any communication should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, by October 21, 1937.

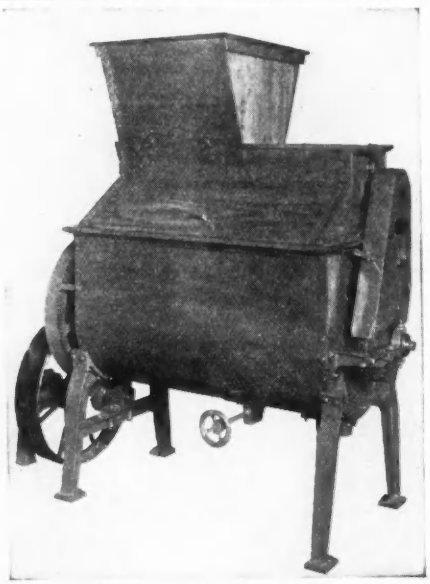
Rubber Technology Conference

Preliminary Technical Programme

FOR several years the council of the Institution of the Rubber Industry has endeavoured to arrange a conference for the purpose of bringing together a representative gathering of rubber technologists from overseas. The council now announces that the Rubber Division of the American Chemical Society is willing to support such a conference, which is being arranged to be held in London on May 23-25, 1938. Cordial invitations are extended to rubber technologists in all countries as it is felt that many will be glad to take this opportunity of meeting their colleagues in the industry.

It is intended that matter submitted to the conference shall be original, and definitely practical in character. Not only will there be the opportunity for those attending to discuss matters of mutual interest, but it is hoped to provide for visits of inspection to rubber works, and to the leading scientific and educational institutions. Further, the Conference Organisation Committee will appoint a general reporter for each section of the conference, whose duties will include the preparation of a general review of papers submitted, and the direction of the attention of the meeting to points which might most usefully be discussed. Copies of papers, and the general reports, will appear as long in advance of the conference as possible, thus conserving the major portion of conference time for profitable discussion.

In order that the conference may meet with a definite object in view the council has decided that the principal part shall be a symposium on methods of improving and evaluating the durability of rubber, dealing with manufacturing conditions, including compounding, "synthetic rubbers," etc.



Dry powder mixer, designed and fabricated by J. P. Van Gelder & Co. Ltd., Sydney, N.S.W. This machine is specially designed to resist corrosion at every point, Monel being used for the mixing spindle and ribbons, the trough lining, the wire gauze and even for wiring the brush brittles. Ni-Resist (nickel cast iron) is used for mixing arms, outlet casting, brush frame end castings, hopper agitator cam and blocks, and brush stave castings.

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Bleaching, Dyeing, Finishing

Oxidation in the dyestuffs industry. F. Henesey, *J. Soc. Dyers Colourists, 53,* 345-347.

Studies in the pentacene (dinaphanthracene) series. C. Marschalk, *Rev. Générale Matières Colorantes, 41,* 353-357.

The scouring of wool from a physico-chemical point of view. C. Sunder, *Teintex, 2,* 533-536.

Causes of faults in scouring. E. M. Müller, *Wascherei u. Plätterei Ztg.,* 1937, 570-572.

The acid dyeing wool process. A. L. Smith and M. Harris, *Textile Manuf., 63,* 375-378.

Recent results in the chemistry of the textile assistants. Dr. Jackel, *Seide u. Kunstseide, 42,* 293-296.

The sulphur content of wool and its properties. "Technologist," *Textile Mercury, 97,* 279.

Glass, Ceramics

Elastic and viscous properties of several soda-silica glasses in the annealing range of temperatures. N. W. Taylor and P. S. Dear, *J. Amer. Ceramic Soc., 20,* 296-304.

The chemical resistance of glass and methods of testing. W. Tepokl, *Glashütte, 67,* 525-527.

Process for the preparation of articles from vitreous quartz. F. Skaupy, *Glastechn. Ber., 15,* 306-308.

Silicate science. G. W. Morey, *J. Amer. Ceramic Soc., 20,* 283-287.

Notes on the mechanical properties of refractory materials. A. L. Roberts, *Trans. Ceramic Soc., 36,* 326-341.

Metals, Electrometallurgy

Crystalline manganese sulphide in chilled cast iron. O. W. Ellis, *Metals and Alloys, 8,* 221-223.

Fundamental principles of metallic protection. U. R. Evans, *J. Birmingham Met. Soc., 17,* 52-79.

Fats, Oils, Waxes

A refraction method for the estimation of the iodine value of raw linseed oil. F. H. Lehberg and W. F. Geddes, *Canadian J. Research, 15,* C, 349-361.

Researches on the obtaining of fats by means of micro-organisms. H. Fink, H. Halhn and Hoerburger, *Chem.-Ztg., 61,* 689-693, 723-726.

Carotin in fats and oils. S. H. Bertram, *Oele Fette Wachse,* 1937, No. 8, 1-2.

Paints, Pigments, Resins

Pigmented lacquers. G. Howse, *J. Electrodepositors' Techn. Soc.,* 1937, 129-132.

Blown linseed oil. I. Mellan, *National Paint Bull., 1,* No. 9, 12-13.

The application of nitrocellulose in stripping agents. A. Kraus, *Farbe u. Lack,* 1937, 389.

The physics and chemistry of paintings. F. I. G. Rawlins, *J. Royal Soc. Arts, 85,* 933-968.

Rubber, Plastics

Some applications of the microscope to rubber technique. J. S. Tidmus and D. Parkinson, *Trans. Inst. Rubber Ind., 13,* 52-69.

Preservation of latex by acids. E. Rhodes and K. C. Sekar, *India Rubber World, 96,* 54.

Rubber as a chemical raw material. A. Nielson, *Chem.-Ztg., 61,* 721-723.

Artificial masses in the chemical industry. K. Mienes, *Nitrocellulose, 8,* 135-139.

Amino plastics. H. Courtney Bryson, *Plastics, 1,* 150-151.

Miscellaneous

Disinfecting fluids and sprays. C. K. Allerton, *Soap Perfum. Cosmetics, 10,* 744-746.

The art of filtration. E. A. Alliott, *Trans. Ceramic Soc., 36,* 342-375.

Chemical control of steeping. L. Pollak and L. Deimel, *Collegium,* 1937, No. 7, 304-414.

Acid-proof adhesives. W. Obst, *Gelatine Leim Klebstoffe 5,* 109-111.

A study of the depression of eutectic points. H. J. Muller, *Ann. Chim., 8,* 143-241.

Personal Notes

LORD TRENT will be the principal guest at the Newark Chamber of Commerce dinner on October 22.

MR. P. B. COOKE has been appointed to the board of Associated British Maltsters, as one of the joint managing directors.

DR. NOAH MORRIS, lecturer in biochemistry at Glasgow University, has now been appointed professor of materia medica and therapeutics.

MR. W. CROSSLEY was re-elected to the board of the Yorkshire Dyeing and Proofing Co., Ltd., at a general meeting of the company held on September 23.

PROFESSOR SMEATH THOMAS, professor of chemistry in the University of Cape Town, has accepted the mastership of Rhodes University College at Grahamstown.

SIR ALEXANDER GRANT, of Hermitage Drive, Edinburgh, managing director of McVitie and Price, Ltd., biscuit manufacturers, has left estate in Great Britain valued at £1,039,976.

MR. A. C. JENNINGS, of Comonwealth Oil Refineries, Ltd., has now been appointed manager to the company in Victoria. Until recently he was acting manager, and formerly assistant manager in New South Wales.

MR. JAMES S. MORRISON has been presented with two water colours on the occasion of his retirement from Robert Morrison and Co., paint manufacturers and oil merchants, Bishop Street, Glasgow. Mr. Morrison, who is senior partner, has been connected with the firm for 54 years.

MR. WILLIAM HARRISON, MR. JOHN MACLEAN CONNELL and MR. C. G. G. HAYMAN, all directors of the Distillers Co., Ltd., have accepted an invitation to join the board of United Glass Bottle Manufacturers, Ltd. MR. WILLIAM REID, who is managing director of John Haig and Co., Ltd., associated with the Distillers Co., Ltd., has also accepted a similar invitation.

LORD LEVERHULME is to be the Charter Mayor of Bebington, Cheshire. The borough includes within its borders the Lever Brothers' soap works at Port Sunlight, the Bromborough Dock of Lever Brothers, Price's candle and soap works, the Bromborough margarine works, and the chemical works of Brotherton and Co., the British Oxygen Co., Ltd., and Commercial Solvents (Great Britain).

MR. H. ELLIS C. WILSON, M.B., D.Sc., professor of biochemistry and nutrition at the All-India Institute of Hygiene and Public Health, Calcutta, and part-time professor of chemistry at the Medical College, Calcutta, has been appointed to the lectureship in pathological bio-chemistry at the Royal Hospital for Sick Children, Glasgow. The appointment has been made by the Glasgow University Court.

MR. C. W. DYSON PERRINS has received the freedom of the City of Worcester "in recognition of his eminent service and beneficence in the cause of art, learning, and science, to local education, and to the industrial life of the city." He had been associated with Lea and Perrins, Ltd., and the Royal Porcelain Works, and by the development of the works had given increased employment to Worcester workers. He had provided the Perrins Hall and a science block at the Grammar School. He had also given a large sum to Oxford University for the development of organic chemistry and the promotion of chemical research.

OBITUARY

MR. JOSEPH WEST, for 19 years the coke-ovens and by-products plant manager of the Powell Duffryn Co., Ltd., died at Aberbargoed (Glam.), on September 27, aged 67 years.

MR. THOMAS HORABIN, of Halton View, Widnes, employed for fifty years as a chemist at the works of the United Alkali Co., Ltd., died suddenly in Whiston Infirmary on September 18, at the age of 72. Old employees of the Marsh Works attended the funeral.

MR. JOSEPH HAROLD TOTTON, F.I.C., public analyst for Belfast for about twenty years, died at his home, Malone Park, Belfast, recently. He was educated at Campbell College and Queen's University, and became a fellow of the Institute of Chemistry in 1910.

MR. EDWARD CHARLES BARLOW, a pioneer of the tin box making business, died on September 25, in his 91st year. In 1869 he founded the firm of Edward C. Barlow and Sons, Ltd., of Hackney, which in 1929 was one of the group of businesses which merged into the modern Metal Box Co., Ltd., of which to-day his son, Mr. Robert Barlow, is managing director.

MR. GEORGE HARRY PEARSON-PERRY, chairman since 1908 of Mobberley and Perry (Stourbridge), Ltd., firebrick manufacturers, died at Pedmore, Stourbridge, on September 24, at the age of 68. He entered the refractory business in 1887; his father was one of the founders of Mobberley and Perry. Mr. Pearson-Perry was a member of the Ceramic Society, the Society of Gas Engineers, and the Society of British Gas Industries. He was also a member of the wages board for the fireclay industry, and a past chairman of the Stourbridge Fire Brick Association.

Foreign Chemical Notes

Hungary

PRODUCTION OF A.R. CHEMICALS is about to be embarked upon by the Hungaria Artificial Fertiliser Co.

A STATE-CONTROLLED SMELTING PLANT may be set up to exploit silver and zinc deposits located near Gyöngyös-Oroszi.

Jugoslavia

HYDROGEN PEROXIDE MANUFACTURE has been commenced by the firm of Dr. M. and C. A. Pogacnik at Podnart.

AN AMBITIOUS CHEMICAL MANUFACTURING SCHEME is to be undertaken by the Dinara Co. on a site at Zablace. The projcets include factories for portland cement, phosphorus, alumina cement, phosphate fertilisers, and laboratories and housing facilities.

Russia

PLANS ARE IN PREPARATION for the planting of the kau-sagis rubber tree over an area of 6,800 hectares in 1938, as compared with the present area under cultivation of 1,000 hectares.

BLAST FURNACE GASES ARE UNDER INVESTIGATION, as a source of phosphoric acid, at the Moscow Research Institute for Fertilisers and Pesticides. If the tests are successful, a semi-works plant will be erected.

THE POSSIBILITIES OF SELECTIVE REFINEMENT for petroleum, using nitrobenzene, are under investigation in an experiment plant at the Mendelejeff Oil Refinery at Constantinooka, and it is understood that plants are being erected at Baku and Grosny.

Japan

TARTAR EMETIC PRODUCTION, at the monthly rate of 15 tons, has been embarked upon by Dainippon Sayaku K.K.

COBALT MANUFACTURE HAS BEEN STARTED by the Japanese Soda Company at the Horai Mines (province of Yamanashi).

INCREASED PRODUCTION OF UREA is planned by the Sumitomo Kagaku Kogyo K.K., to bring the monthly output up to 30 tons.

ZINC SULPHATE AND CHROMIUM OXIDE are now being manufactured by Nippon Kagaku Kogyo K.K. (Japanese Chemical Industry Co.).

WITH A CAPITAL OF 1 MILLION YEN, the Ouchi Shinko Kagaku Kogyo K.K. (Ouchi New Chemical Industry Co.) has been formed for the manufacture of photographic and rubber chemicals.

From Week to Week

THE BURMAH OIL CO.'S 1,000,000 gallon crude oil storage tank at Syriam, near Rangoon, was struck by lightning and set on fire on September 29.

THE SEPTEMBER ISSUE of "Sands, Clays and Minerals" contains articles on borax and boric acid and their less-known applications, the use of bentonite in industry, beryllium and its alloys, and oxychloride cements.

THE BRITISH COMMERCIAL GAS ASSOCIATION held their 26th national conference, at Manchester, this week. Sir David Milne-Watson, governor of the Gas Light and Coke Company gave an address on "National Fuel Policy."

A. GALLENKAMP AND CO., LTD., have introduced a new ultra self-illuminated magnifying lens which gives a brilliant white light and a fifteen (area) magnification, to bring out points of strength or weakness in the examination of materials.

THE DUKE OF KENT is to open the Treforest Trading Estate, South Wales, on October 20. The estate is a Government-assisted scheme started at the instigation of the Commissioner for the Special Areas for attracting new industries to South Wales.

A URANIUM DEPOSIT OF WORLD IMPORTANCE is reported to have been discovered in the Cordoba Province, Argentina. The director of the mines in this province states that "it may also be possible to extract helium from the radio-active salts in the deposit."

CANADA'S PRODUCTION OF GYPSUM in June totalled 161,978 tons, as against 113,570 tons in May, and 136,537 tons in June, 1936. The output during the first six months of the year reached 377,908 tons, as against 206,271 tons during the corresponding period of 1936.

THE BRITISH CAST IRON RESEARCH ASSOCIATION has published an index to its reports and publications, 1934-37. Two indexes have been issued previously by the Association, the first covering reports published during the period 1924-32, and the second those issued during 1932-34.

IMPROVEMENTS IN WIDE FIELD BINOCULAR MICROSCOPES are announced by the Bausch and Lomb Optical Co. Optically, the instruments remain unchanged, and still retain their unique characteristics of extremely wide field of vision, range of magnification (3.9×—150×), and depth of focus; mechanically, the stands are much improved.

THE LINDE AIR PRODUCTS CO., a unit of Union Carbide and Carbon Corporation, has published a folder on "Steel Hard-Facing Procedure." This pamphlet has been reprinted from the April, 1937, issue of "Oxy-Acetylene Tips," and presents detailed instructions for applying the hard-facing material to steel wearing surfaces.

FIVE POST-GRADUATE COURSES OF LECTURES will be given at the Liverpool Central Technical College during the winter months to meet the requirements of graduates who have been in industry for several years, and who wish to keep in touch with modern theories. There will be courses on the spectroscope and its uses in industry, colloids and emulsions, and recent progress in theoretical and experimental organic chemistry.

GENERAL REFRACTORIES, LTD., has acquired the whole of the share capital of Charles Davison and Co., Ltd., of Buckley, Flintshire, founded in 1844. The acquired company possess beds of a fireclay of unique quality and have built up a notable business in adamantine linings for rotary cement kilns. They also specialise in the production of bricks and linings of obsidianite for use in the construction of absorption towers at acid works.

LANCASTER AND TONGE, LTD., makers of steam traps, metallic packings, throttle valves, etc., report that they have sold over 20,000 of the "Lancaster" patent bell-float steam trap since it was first introduced on the market six years ago. This trap is intended to replace the "bellows" expansion trap which is liable to damage, either by adjustment or in working. It has a reliable mechanical action and is specially suitable for draining heaters.

THE GERMAN GOVERNMENT is endeavouring to secure large supplies of Mexican petroleum and its products. Herr Karl Erk and Herr Alfred Benz, officials of a Berlin Bank, have arrived in Mexico City to discuss an oil agreement. It is understood that the bank intends to give substantial financial aid to an enterprise organised by the Mexican Government. Mexican oils are being exported to Germany in progressively increasing amounts and have totalled nearly 300,000 barrels a month this year.

STATISTICAL COMPILATIONS on aluminium, lead, copper, nickel, quicksilver, silver, spelter and tin, are given by Metallgesellschaft A.-G., in their 38th annual issue. It is stated that the upward movement both in prices of metals and in turnover of metal is reflected also in a considerable improvement in the profits of the world's metal producing companies. Whereas in the case of 15 foreign companies examined, in 1932 considerable losses still resulted, profits which come to 60 per cent. of the profit obtained in 1929 were shown by these companies for the year 1936.

THE PAROZONE CO., LTD., have found it necessary to extend their London factory to cope with the demand for their product.

LORD MCGOWAN will give an address at the National Safety Congress which is to be held at Park Lane Hotel, London, October 7-9.

THE SCOTTISH C.W.S. SOAP WORKS at Grangemouth have introduced a five-day week for the majority of their employees as from September 24.

HERIOT-WATT COLLEGE, Edinburgh, has now been recognised by the Pharmaceutical Society of Great Britain, as suitable for students in chemistry.

SIR ALEXANDER GIBB will deliver his presidential address at the first ordinary meeting of the Institute of Transport for the session 1937-38 to be held at the Institution of Electrical Engineers on October 11, at 5.30 p.m.

THE STANTON IRONWORKS CO., LTD., is considering the erection of a battery of coke-ovens at Hallam Fields, Ilkeston, near the company's works at Stanton. It is expected that some of the gas produced would be used by the Stanton works.

FOUNTAIN PRODUCTS, LTD., chemical manufacturers, Victoria House, Southampton Row, London, W.C.1, have increased their nominal capital by the addition of £150 beyond the registered capital of £2,500. The additional capital is divided into 3,000 ordinary shares of 1s.

THE NEW PHYSICS DEPARTMENT of University College, Southampton, is nearing completion. This £21,000 building is notable for thermal insulation, the external walls are 17 inches thick and several laboratories are to be provided with electrical thermostatic control.

THE LANGLOAN IRONWORKS, Coatbridge, will re-open in December, and will give work to more than 2,000 men. Sir Henry Fiddes, M.P. for Dumfries, is sponsor of the scheme and the new company will operate under the title of the Langloan Iron, Cement and Chemical Co.

IN ORDER TO PROVIDE THE FUNDS necessary to complete their present programme of expansion, the British Aluminium Co., Ltd., are offering to its existing ordinary shareholders 1,000,000 new £1 ordinary shares at 42s. 6d. per share. The new shares will be offered in the proportion of one new share for every two held.

THE NORWEGIAN HYDRO-ELECTRIC NITROGEN CORPORATION announces that series "A" of the 5½ per cent. refunding and improvement gold bonds has been called for redemption at par on November 1 next. The bonds may be presented at once, however, for payment in full with interest to November 1, at the head office of the National City Bank of New York, 55 Wall Street, New York.

THE FIRST INTERNATIONAL EXHIBITION OF MODERN PACKAGING has opened at the Reimann School, Regency Street, London, S.W.1, on September 27. Among the 1,200 exhibits are collections of boxes, cartons, bottles, jars, cans and wrapping materials from the United States, Canada, Australia, South Africa, India and 17 European countries, as well as a representative collection of British packages.

ALLEGATIONS THAT A GASHOLDER at the Moreton-in-Marsh works of the Chipping Norton Gas Co. was a danger to the men working in the gasworks, and to the occupants of adjacent cottages were made by a Home Office Inspector at Moreton Police Court on September 27, in applying for an interim order prohibiting the use of the holder until October 14, when the Home Office will apply to the Bench for an order prohibiting further use.

NICKEL AND OTHER CARBONYLS will form the subject of a lecture to be given by Mr. A. E. Wallis at the University Chemical Department, Woodland Road, Bristol, on October 7. Mr. Wallis will refer briefly to the discovery of nickel carbonyl and will trace the development of the refining processes, giving a detailed description of the modern methods employed by the Mond Nickel Co., Ltd., at its Clydach refinery. Other metallic carbonyls will also be dealt with, and the lecturer will discuss their chemical and physical properties.

IT IS ANTICIPATED THAT INDIA will have its first supply of soda ash from local sources before the middle of 1938. Imperial Chemical Industries, India, Ltd., is expected to build its first factory at Khewra, near Jhelum, in the salt range of the province. There is a persistent rumour here that Tata and Sons, Ltd., has also decided to start a factory for the production of soda ash in Western India. Discussions on these plans were held in London during recent months. It is stated that a joint stock company will be floated in the near future for the acquisition of the Okha salt works and the erection of a factory near Port Okha.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

MANUFACTURE OF FLEXIBLE FILMS, ETC., of polymerised organic compounds.—Imperial Chemical Industries, Ltd., W. E. F. Gates, and A. Renfrew. 24056.

CONVERSION OF LOWER NITROGEN OXIDES into nitrogen peroxide. G. W. Johnson (I. G. Farbenindustrie.) 24319.

SIMULTANEOUS DRYING OF GASES and liquids.—G. W. Johnson (I. G. Farbenindustrie.) 24320.

MANUFACTURE OF ANTI-KNOCK MOTOR FUELS.—G. W. Johnson (I. G. Farbenindustrie.) 24321.

MANUFACTURE OF RESINOUS CONDENSATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) 24322.

SLUICING-OUT OF LIQUIDS under pressure.—G. W. Johnson (I. G. Farbenindustrie.) 24405.

MANUFACTURE OF AZO-DYESTUFFS.—G. W. Johnson (I. G. Farbeniudustrie.) 24406.

PRODUCTION OF AMINES.—Kodak, Ltd. (United States, Sept. 5, '36.) 24288.

MANUFACTURE OF CELLULOSE DERIVATIVES, ETC.—L. Lilienfeld. 24415.

PRODUCTION OF GAS, ETC.—Linde Air Products Co. (United States, Oct. 1, '36.) 24064.

PRODUCTION OF CORROSION-RESISTANT COATING for magnesium, etc.—Magnesium Elektron, Ltd. (Germany, Sept. 4, '36.) 24216.

MANUFACTURE OF CHEMICALS.—Mathieson Alkali Works. (United States, Sept. 29, '36.) 23986.

PRODUCTION OF DRYING-OILS.—Metallges, A.-G. (Germany, Dec. 9, '36.) 24426.

SACCHARISATION OF CELLUSOIDAL SUBSTANCES.—Naamlooze Vennootschap Internationale Suiker en Alcohol, Compagnie International Sugar and Alcohol Co., Isaco, F. Koch, and H. Koch. 24385.

PROCESS FOR MEASURING THE TANNING-AGENTS in tanning liquors. W. Petrie. 24082.

MANUFACTURE OF CELLULOSE HYDRATE PRODUCTS.—W. B. Pratt. (United States, May 12.) 24497.

PURIFICATION OF SUGAR-JUICES.—D. Teatini. 24140.

REMOVAL OF WAX, ETC., FROM FLUID COMPOUNDS OF HYDROCARBONS.—Aktiebolaget Separator-Nobel. (Germany, Sept. 28, '36.) 24705.

CARBAZOLE-ALKYL KETONES.—Armour and Co. (United States, Sept. 19, '36.) 25062.

MANUFACTURE OF CYANINE DYES.—B. Beilenson and Kodak, Ltd. (April 26.) 24793.

MANUFACTURE OF LUBRICANTS.—British Thomson-Houston Co., Ltd. (United States, Sept. 12, '36.) 24892.

MANUFACTURE OF AMINES.—A. Carpmael. (I. G. Farbenindustrie.) 24755.

METHOD OF PREPARING COLLOIDAL SUSPENSIONS OF GRAPHITE.—R. R. Ducas. (Feb. 1.) (France, Feb. 7, '36.) 24760.

NITRATION OF CELLULOSE, ETC.—R. J. Quaid, L. S. Baker and E. I. du Pont de Nemours and Co. 24766.

PRODUCTION OF OIL-PROOFED FIBROUS MATERIAL, ETC.—E. F. Izard and E. I. du Pont de Nemours and Co. 24767.

MANUFACTURE OF PIGMENTED COATING-COMPOSITIONS.—G. D. Patterson and E. I. du Pont de Nemours and Co. 25022.

PRODUCTION OF VERMIN-KILLERS.—A. Esch and E. Cohn. 24703.

MANUFACTURE OF DYEING, ETC.—R. E. Etzelmiller and E. I. du Pont de Nemours and Co. 25127.

PRODUCTION OF ZINC SULPHIDE.—W. E. Evans. (Riedel-E. de Haën Akt.-Ges.) 24904.

MANUFACTURE OF SULPHONIC ACIDS OF THE NAPHTHALENE SERIES. J. R. Geigy A.-G. (Switzerland, Sept. 11, '36.) 24726.

PRODUCTION OF STAECH FOR FOOD PURPOSES.—H. Gerstle. (Germany, Sept. 16, '36.) 24598.

MANUFACTURE OF NITROAMINO COMPOUNDS.—J. L. Grieve and P. C. Carter. 24639.

PRODUCTION OF INDIGO DYEINGS.—W. W. Groves (I. G. Farbenindustrie). 24885.

MANUFACTURE OF ESTERS.—W. W. Groves (I. G. Farbenindustrie). 25089.

CARBONISATION OF PITCH.—W. W. Groves (Dr. C. Otto and Co., Ges.) 25106.

MANUFACTURE OF MELAMINE.—W. W. Groves (Soc. of Chemical Industry in Basle). 24608.

MANUFACTURE OF PREPARATIONS containing calcium compounds. L. Hamburger. (United States, April 19.) 24715.

PRODUCTION OF METALLIC BARIUM.—I. G. Farbenindustrie. (Germany, Jan. 9.) 24861.

MANUFACTURE OF 2-ALKYLHEXAHYDROBENZTHIAZOLES and 2-alkylhexhydrobenzselenazoles.—I. G Farbenindustrie. (Germany, Sept. 16, '36.) 24986.

SAPONIFICATION OF SHAPED ARTICLES.—I. G. Farbenindustrie. (Germany, Sept. 23, '36.) 24986.

MANUFACTURE OF NITROAMINE COMPOUNDS.—Imperial Chemical Industries, Ltd. 24639.

PRODUCTION OF PHENOL-FORMALDEHYDE MOULDING POWDERS.—Imperial Chemical Industries, Ltd., and A. Caress. 24905.

TREATMENT OF TAIL-GASES FROM OXIDE OF NITROGEN ABSORPTION SYSTEMS.—Imperial Chemical Industries, Ltd., and J. Bell. 25126.

PRODUCTION OF RUBBER THREADS.—International Latex Processes, Ltd. 24579, 24580.

MANUFACTURE OF VAT DYESTUFFS.—G. W. Johnson (I. G. Farbeniadustrie.) 24622.

MANUFACTURE OF DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 24781.

PURIFICATION OF SYNTHETIC METHANOL.—G. W. Johnson (I. G. Farbenindustrie.) 24894.

PRODUCTION OF AMINES.—Kodak, Ltd. (United States, Sept. 9, '36.) 24592.

HARDENING OF PHOTOGRAPHIC EMULSIONS.—Kodak, Ltd. (United States, Sept. 10, '36.) 24687.

PROCESS FOR REMOVING SULPHUR, ETC., FROM IRON, ETC.—F. Krupp Grusonwerk A.-G. (Germany, Oct. 20, '36.) 24717.

APPPARATUS FOR DISPENSING MEASURED QUANTITIES OF OIL, ETC.—A. M. Lowe. 24569.

HOMOGENISERS.—R. G. Lowe. 24976.

PRODUCTION OF MOTOR FUELS.—A. L. Mond (Universal Oil Products Co.) 25013.

PRODUCTION OF SALTS.—Norsk Hydro-Elektrisk Kvaelstof-Aktieselskab. (Norway, Sept. 22, '36.) 24873.

MANUFACTURE OF PIGMENTED COATING-COMPOSITIONS.—G. D. Patterson. 25022.

MANUFACTURE OF PRODUCTS FROM FIBROUS MATERIAL IMPREGNATED WITH SYNTHETIC RESINS.—C. D. Philippe and Bakelite, Ltd. 24805.

NITRATION OF CELLULOSE, ETC.—R. J. Quaid. 24766.

MANUFACTURE OF ANTHRAQUINONE COMPOUNDS—W. L. Rintelman, A. J. Wuertz and E. J. Du Pont de Nemours and Co. 24640.

PURIFICATION, ETC., OF COLLOIDAL DISPERSIONS.—Semperit Oesterreichisch-Amerikanische Gummiwerke A.-G. (Austria, Sept. 12, '36.) 24909, 24910.

MANUFACTURE OF KETONES.—Standard Alcohol Co. (United States, Nov. 7, '36.) 24921.

RESINS.—Standard Oil Development Co. (United States, Oct. 27, '36.) 24840.

PRODUCTION OF STARCH, ETC., FROM MAIZE.—W. J. Tennant (Deutsche Maizena Ges.) 25123.

PRODUCTION OF FISH-LIVER OIL.—A. Thorsteinsson. 24716.

MANUFACTURE OF PHENOLIC-ACETALDEHYDE.—W. W. Triggs (Ellis-Foster Co.) 24968.

MANUFACTURE OF PIGMENTS FOR PAINTS CONTAINING AQUEOUS BINDERS.—Dr. R. Vereinigte Werke, Alberti and Co. and E. Alberti. (Germany, July 24.) 24744.

MANUFACTURE OF BARIUM SULPHATE PREPARATIONS.—Dr. R. Vereinigte Werke, Alberti and Co. and E. Alberti. Germany, Oct. 19, '36.) 24745.

MANUFACTURE OF BARIUM SULPHATE PREPARATIONS.—Dr. R. Vereinigte Werke, Alberti and Co. and E. Alberti. (Germany, July 24.) (Cognate with 24745.) 24746.

MANUFACTURE OF ANTHRAQUINONE THIAZOLES.—A. J. Wuertz. 24640.

Specifications Open to Public Inspection

PROCESS AND APPARATUS FOR THE BATCH DISTILLATION OF LIQUID MIXTURES.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. March 12, 1936. 6679/37.

MANUFACTURE AND USE OF ACRYLIC ACID ESTERS AND POLYMERISATION PRODUCTS THEREOF.—Rohm and Haas A.-G. March 7, 1936. 6801/37.

TREATMENT OF SOLUTIONS OF TITANIUM SULPHATE.—Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury and Van Der Lande. March 7, 1936. 6831/37.

PRODUCTION OF TITANIUM DIOXIDE AND PRODUCTS CONTAINING THE SAME.—Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury and Van Der Lande. March 7, 1936. 6832/37.

SIMULTANEOUS MANUFACTURE OF IRON OR OF ITS CARBIDE COMPOUNDS, AND CEMENT, OR HYDRAULIC LIME IN A ROTATING HEARTH.—L. P. Basset. March 9, 1936. 6882/37.

MANUFACTURE OF DIAZO PREPARATIONS.—Soc. of Chemical Industry in Basle. March 9, 1936. 6894/37.

METHOD AND APPARATUS FOR VAPOURISING HEAVY OIL.—M. Petit. March 11, 1936. 6925/37.

PROCESS FOR THE PRODUCTION OF ALIPHATIC CARBOXYLIC ACIDS.—A. Imhausen and C. Staennings (trading as Markische Seifen-Industrie). March 10, 1936. 6985/37.

REFINING HYDROCARBONS.—E. W. Hultman. March 10, 1936. 7025/37.

PROCESS FOR PRODUCING COLOUR DISCHARGES ON DYED GOODS.—Soc. of Chemical Industry in Basle. March 10, 1936. 2040/37.

MANUFACTURE OF CHROMIFEROUS DYESTUFFS.—I. G. Farbenindustrie. March 11, 1936. 7042/37.

SENSITISING DYES FOR SILVER HALIDE EMULSIONS.—Perutz Trockenplattenfabrik, O. Munchen Ges. March 13, 1936. 7079/37.

MANUFACTURE OF INTERMEDIATE PRODUCTS AND SULPHURETTED DYESTUFFS THEREFROM.—Soc. of Chemical Industry in Basle. March 11, 1936. 7172/37.

MINERAL OIL COMPOSITION AND METHOD OF MAKING SAME.—Socony-Vacuum Oil Co., Inc. March 12, 1936. 7181/37.

MANUFACTURE OF ALKALI METALS.—Imperial Chemical Industries, Ltd.. March 11, 1936. 7229-30/37.

ESTERS OF ACRYLIC ACID AND POLYMERISATION PRODUCTS THEREOF.—Rohm and Haas A.-G. March 12, 1936. 7340/37.

MANUFACTURE OF GAS MASKS.—Soc. des Procedes Ecla. March 12, 1936. 7367/37.

MANUFACTURE OF THYROXIN.—I. G. Farbenindustrie. March 13, 1936. 7429/37.

PRODUCTION OF SPONGY PRODUCTS.—J. A. Talalay. March 13, 1936. 7600/37.

METHOD OF PREPARING COLLOIDAL SUSPENSIONS OF GRAPHITE.—R. R. Ducas. February 7, 1936. 24760/37.

Specifications Accepted with Date of Application

PRODUCTION OF EMULSIFYING AND LIKE AGENTS.—S. Z Perlmuteer. Dec. 4, 1935. 471,666.

DISTILLATION OF ALCOHOL.—L. Mellersh-Jackson (Standard Oil Co. of California). Dec. 5, 1935. 471,667.

MANUFACTURE OF SULPHUR.—M. Pourbaix and Soc. Generale Industrielle et Chimiques du Katanga (Sogechim). Jan. 2, 1936. 471,668.

POLYMERISATION OF ETHYLENE.—E. W. Fawcett, R. O. Gibson, M. W. Perrin, J. G. Paton, E. G. Williams, and Imperial Chemical Industries, Ltd. Feb. 4, 1936. 471,590.

PROCESS FOR SEPARATING STEREOISOMERIC ALCOHOLS OF THE ANDROSTANE SERIES.—A. G. Bloxam (Soc. of Chemical Industry in Basle). Feb. 5, 1936. 471,803.

FILTER-LAYERS FOR COLOUR PHOTOGRAPHY.—W. W. Groves (I. G. Farbenindustrie.) Feb. 6, 1936. 471,520.

ARTIFICIAL RESINS.—Carbide and Carbon Chemicals Corporation. Feb. 9, 1935. 471,670.

STABILISATION OF ANIMAL AND VEGETABLE FATS AND OILS.—E. I. du Pont de Nemours and Co. March 5, 1935. 471,532.

PREPARATION OF LIGHT-SENSITIVE EMULSIONS.—Dr. C. Schleussner A.-G. March 22, 1935. 471,676.

SAFETY DEVICE FOR DISTILLATION APPARATUS AND THE LIKE.—W. E. Booth and Imperial Chemical Industries, Ltd. March 5, 1936. 471,542.

MANUFACTURE AND PRODUCTION OF VAT DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) March 6, 1936. 471,743.

LUBRICANTS.—Continental Oil Co. March 18, 1935. 471,593.

MANUFACTURE AND PRODUCTION OF CHLORBUTADIENE.—G. W. Johnson (I. G. Farbenindustrie.) March 7, 1936. 471,744.

PRINTING OR PADDING WITH VAT-DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) March 7, 1936. 471,808.

MANUFACTURE AND PRODUCTION OF TRIARYLMETHANE DYESTUFFS CONTAINING METAL.—G. W. Johnson (I. G. Farbenindustrie.) March 7, 1936. 471,686.

TANNING AND MATERIALS THEREFOR.—A. H. Stevens (Hall Laboratories, Inc.) March 9, 1936. 471,753.

PROCESS FOR PRODUCING HYDROCARBONS BY THE CATALYTIC REDUCTION OF OXIDES OF CARBON WITH HYDROGEN.—Ruhrchemie A.-G. March 20, 1935. 471,595.

POLYMERISATION OF METHACRYLIC ACID ESTERS.—E. I. du Pont de Nemours and Co. March 8, 1935. 471,755.

DEGREASING OF METALLIC ARTICLES.—E. I. du Pont de Nemours and Co. March 7, 1935. 471,756.

TANNING PROCESSES AND MATERIALS THEREFOR.—A. H. Stevens (Hall Laboratories, Inc.) March 10, 1936. 471,811.

PROCESS FOR THE MANUFACTURE OF STIFF AND WASHABLE TEXTILE FABRICS.—A. Carpmael (I. G. Farbenindustrie.) March 10, 1936. 471,866.

MANUFACTURE OF CHLORINATED RUBBER.—L. W. Weickhardt and Imperial Chemical Industries, Ltd. March 10, 1936. 471,818.

PRODUCTION OF SUSPENSIONS OF PIGMENTS.—British Titan Products Co., Ltd. July 26, 1935. 471,827.

PRODUCTION OF COMPOSITE PIGMENTS.—Titan Co., Inc. Aug. 24, 1935. 471,829.

PROCESS AND APPARATUS FOR CARRYING OUT PHYSICAL AND CHEMICAL PROCESSES.—G. Von. Becze. Sept. 15, 1936. 471,783.

MANUFACTURE AND TREATMENT OF CELLULOSE DERIVATIVES.—British Celanese, Ltd. Nov. 13, 1935. 471,833.

BITUMINOUS EMULSIONS.—C. R. de Berry. Nov. 16, 1936. 471,650.

INDUSTRIAL PRODUCTION OF ALUMINA POWDER.—Siemens and Halske A.-G. Nov. 30, 1935. 471,835.

PROCESS FOR MANUFACTURING A POWDERED PRODUCT FROM THE MUCILAGINOUS SUBSTANCES OF EEL.—T. Mayehara. Dec. 4, 1936. 471,652.

MANUFACTURE OF ACETYLENE.—British Celanese, Ltd., H. Dreyfus and W. H. Groombridge. March 10, 1936. 471,837.

MANUFACTURE OF SULPHURIC ACID BY THE CONTACT PROCESS.—A. Zieren. Dec. 18, 1935. 471,653.

METHOD OF PURIFYING SULPHUR.—W. W. Triggs (Bolidens Gruvaktiebolag.) Dec. 24, 1936. 471,839.

APPARATUS FOR CONTINUOUSLY CRYSTALLISING SOLUTIONS.—N. V. Werkspoor. Jan. 11, 1936. 471,841.

REFINING OF SUGAR SOLUTIONS, PARTICULARLY SOLUTIONS CONTAINING DEXTROSE.—J. E. Pollak (International Patents Development Co.) Feb. 12, 1937. 471,845.

MANUFACTURE AND TREATMENT OF CELLULOSE DERIVATIVES.—British Celanese, Ltd. Feb. 24, 1936. 471,847.

METHOD OF DESTROYING TOBACCO PESTS BY MEANS OF CHLOROPICRIN.—M. Schone (née Mokrzecka). March 21, 1936. 471,848.

SKINS FOR SAUSAGES, PIES, AND THE LIKE.—Chemische Forschungsges. April 11, 1935. 471,724.

REDUCTION OF SULPHUR DIOXIDE TO ELEMENTAL SULPHUR.—V. F. Feeny (Consolidated Mining and Smelting Co. of Canada, Ltd.) April 14, 1937. 471,850.

PROCESS FOR CONCENTRATING AQUEOUS FORMALDEHYDE SOLUTIONS.—Deutsche Gold- und Silber-Scheideanstalt Vorm. Roessler. May 8, 1936. 471,726.

PRODUCTION OF METAL CARBIDES.—Follsaun Syndicate, Ltd., and N. Sainderichin. Jan. 9, 1936. (Divided out of 468,757.) 471,792.

Chemical and Allied Stocks and Shares

ENCOURAGED by the many excellent company reports and dividend announcements that have come to hand, there has been improvement of business reported in the industrial section of the Stock Exchange. The general tendency was for prices to make partial recovery from the reaction shown in recent weeks.

Imperial Chemical show a favourable rise on the week from 36s. 7½d. to 38s., sentiment having benefited from market views of dividend prospects, reference to which was made in these notes on the last occasion. British Oxygen also developed an improved tendency around 98s. 9d., awaiting the interim dividend announcement. It is not generally expected there will be any change in the interim, but it is assumed the directors may make a statement as to progress which will indicate that business is continuing to grow. Some market men expect the dividend for the year is likely to be maintained at 15 per cent., but that a further bonus may be distributed with the final payment. Distillers were good, having moved up on the week from 105s. 6d. to 108s. 6d. Borax Consolidated reacted at one time, but recovered later and are 30s. at the time of writing. British Aluminium were lowered 3s. 6d. to 48s. 6d. following news of the new issue of shares, which is being made to shareholders on bonus terms. In view of the larger capital the market is now less hopeful of an increased dividend this year, but it is expected the payment will at least be kept at 10 per cent., and the outlook is regarded as good because of the further large expansion of the business which is to be undertaken.

United Molasses have been active around 29s. 9d. in response to market estimates that the dividend on these 6s. 8d. shares is likely to be brought up to 20 per cent. for the financial year ended this week. Imperial Smelting fluctuated and are 15s. 9d. at the time of writing, compared with 15s. 4½d. a week ago. Triplex Safety Glass also moved rather sharply, but as compared with a week ago have put on 2s. 6d. to 60s. Lancegaye Safety Glass were more active on the progress report issued by the company, while United Glass Bottle were steady around 53s. aided by the assumption that the dividend may be raised to 12 per cent. or 12½ per cent.; for the past year 11 per cent. was paid. Sangers were virtually unchanged at 24s. 7½d. and Timothy Whites and Taylors were again 33s. 3d. Boots Pure Drug were steady at 50s. 7½d., and British Drug Houses higher at around 23s. 6d.

Murex came in for some profit-taking following the recent dividend announcement. Associated Portland Cement improved 9d. to 87s. following declaration of the interim dividend, while British Plaster Board remained steady at around 30s. General Refractories were dull and are lower on balance at 25s. 9d. despite the further acquisition announced by the company and the favourable views of dividend prospects current in the market. British Glues were unchanged at 7s. 6d., but the price was not apparently tested by much business. United Premier Oil and Cake 5s. ordinary received more attention and were moderately higher at 10s. as a result of the larger interim dividend. Unilever and Unilever N.V. were dull, partly owing to selling from the Continent. Fison, Packard and Prentice were again 38s. 9d.

Staveley Coal and Iron and Sheepbridge were both steady under the influence of the excellent results and the statements at this week's meetings. A good deal of importance may attach to the process for extraction of iso-octane fuel from gas, in which the Sheepbridge company has an interest. Thomas Firth and John Brown were higher on the interim dividend. Oil shares were more active in view of the near approach of the interim dividend announcements.

Weekly Prices of British Chemical Products

THE volume of trade in general chemicals during the past week has been very satisfactory. Deliveries under existing contracts continue to be taken up with fair regularity and dealers report a better inquiry for new business. The demand appears to be a little better than the average for the period. The price of citric acid has been advanced by the British makers to 1s. 0¼d. per lb. and sodium hyposulphite, commercial quality, is dearer at £11 5s. per ton. There is a good demand for hexamine and methyl acetone and both items are firm on quotation. In the coal tar section only a very small business is being put through and the market is definitely quiet. Pyridine 90/160 per cent. is dearer on quotation. Toluol and xylol are steady and unchanged. Creosote oil is a bright spot in this market available supplies being sufficient to meet an active demand. Business in cresylic is almost entirely confined to forward contracts and easier quotations are obtainable for this type of business. In other directions values are mostly steady with a firm undertone.

MANCHESTER.—A moderate volume of new business has been reported during the past week in most sections of the Manchester chemical market and where consumers are not already well covered for forward delivery there is little hesitation in doing so having regard to the generally firm condition of prices. The chemical-consuming industries in Lancashire and the West Riding of Yorkshire are mostly well employed and this is reflected in a steady offtake of supplies against existing contracts. Fertiliser distributors in the northern counties report having booked a fair volume of contract business in the aggregate for delivery during the season. Among the tar products there has been little change on balance in the general price position and in most respects the tendency is strong.

GLASGOW.—Since the last report, business in general chemicals has been rather quiet, both for home trade and export. Prices, however, continue very steady at about previous figures, with no important changes to report.

General Chemicals

ACETONE.—£45 to £47 per ton.

ACETIC ACID.—Tech., 80%, £28 5s. per ton; pure 80%, £30 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 per ton d/d Lancs.; GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey galvanising, £17 10s. per ton, ex wharf.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. SCOTLAND: White powdered, £17 ex store. MANCHESTER: White powdered Cornish £17 10s., ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £11 10s. per ton.

BLEACHING POWDER.—Spot, 35/37%, £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHROMETAN.—Crystals, 2½d. per lb.; liquor, £19 10s. per ton d/d. station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—9¼d. per lb., less 2½%; d/d U.K.

CITRIC ACID.—1s. 0¼d. per lb. MANCHESTER: 1s. SCOTLAND: B.P. crystals, 1s. per lb., less 5%, ex store.

COPPER SULPHATE.—£21 7s. 6d. per ton, less 2% in casks. MANCHESTER: £21 10s. per ton f.o.b. SCOTLAND: £23 per ton, less 5%, Liverpool, in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£22 10s. per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £5 7s. 6d. to £6 7s. 6d. per cwt. according to quantity; in drums, £5 to £5 13s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. to 7s. 6d. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 4d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots) Dark, 50% by volume, £23 10s.; by weight, £27 10s.; Pale, 50% by volume, £27; by weight, £32 per ton. LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £36; brown, £1 per ton less. MANCHESTER: White, £36; brown, £35 10s.

LEAD NITRATE.—£39 per ton.

LEAD, RED.—£35 15s. per ton, less 2½% carriage paid. SCOTLAND: £35 per ton, less 2½%, carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £35 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 11d per lb.; powder B.P., 6s. 1d.; bichloride B.P. (corros. sub.) 5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel), 5s. 11d.; red oxide cryst. (red precip.), 7s.; levig. 6s. 6d.; yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.; sulphide black (hyd. sulph. cum sulph. 50%), 6s. For quantities under 112 lb., 1d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—80° Tw. spot, £16 10s. per ton makers' works.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £54 per ton ex store

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

POTASH CAUSTIC.—Solid, £35 5s. to £36 15s. per ton for 2-ton lots ex store; broken, £42 per ton. MANCHESTER: £39.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £38 per ton.

POTASSIUM DICHROMATE.—SCOTLAND: 5d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 5s. 6d per lb. in 7 lb. lots.

POTASSIUM NITRATE.—£27 per ton. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 10¾d. to 1s.

POTASSIUM PRUSSIATE.—6½d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6¼d.

SALAMMONIAC.—Dog-tooth crystals, £36 per ton, fine white crystals, £16 10s. per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 to £3 10s. per ton.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £12 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£18 per ton carriage paid North. GLASGOW: £18 5s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 10s.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE MONOHYDRATE.—£15 5s. per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£26 10s. to £30 per ton. GLASGOW: £1 10s. per cwt., minimum 3 cwt. lots.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM DICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. MANCHESTER: 4d. per lb. GLASGOW: 4d., net, carriage paid.

SODIUM HYPOSULPHITE.—Pea crystals, £14 10s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £10; photographic, £14 10s.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d.

SODIUM NITRITE.—£18 5s. per ton for ton lots.

SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums.
SODIUM PHOSPHATE.—£10 10s. to £11 per ton delivered (Di-basic).
SODIUM PRUSSIATE.—d. per lb. for ton lots. GLASGOW: 5d. to 5¾d. ex store. MANCHESTER: 4d. to 4¾d.
SODIUM SILICATE.—£9 10s. per ton.
SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 12s. 6d.
SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 5s. per ton d/d in drums; crystals 30/32%, £8 15s. per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.
SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d sta- of 5 cwt. and upwards. MANCHESTER: 1s. 1¼d. per lb.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.
TARTARIC ACID.—1s. 1¼d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1¼d. per lb. GLASGOW: 1s. 1d. per lb.
ZINC SULPHATE.—Crystals, £9 per ton, f.o.r., in bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb., according to quality. Crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality
ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £6 10s. per ton, according to quality.
CADMIUM SULPHIDE.—7s. 8d. to 7s. 11d. per lb.
CARBON BLACK.—4¾d. per lb., ex store.
CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.
CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 2d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4¾d. to 5½d. per lb.; dark 4d. to 4½d. per lb.
LAMP BLACK.—£22 to £23 per ton d/d London; vegetable black, £28 to £48.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE.—30%, £16 10s. to £17 5s. per ton.
SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.
VERMILLION.—Pale, or deep, 5s. 3d. per lb., 1-cwt. lots.
ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6 = nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938: October, 1937, £7 6s. 6d. per ton; November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.
CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1938: October, 1937, £7 8s. 9d. per ton; November, £7 10s.; December, £7 11s. 3d.; January, 1938, £7 12s. 6d.; February, £7 13s. 9d.; March, £7 15s.; April/June, £7 16s. 3d.
NITRO CHALK.—£7 10s. 6d. per ton for delivery up to June 30, 1938.
SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1938.
CONCENTRATED COMPLETE FERTILISERS.—£10 12s. to £11 1s. per ton in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 5s. to £13 5s. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d.
CARBOLIC ACID.—Crystals, 7½d. to 8½d. per lb., small quantities would be dearer; Crude, 60's, 4s. to 4s. 3d., dehydrated, 4s. 6d. to 4s. 9d. per gal. MANCHESTER: Crystals, 10½d. per lb. f.o.b. in drums; crude, 4s. 4d. per gal. GLASGOW: Crude, 60's, 4s. 3d. to 4s. 6d. per gal.; distilled, 60's.
CREOSOTE.—Home trade, 6¼d. to 6¾d. per gal., f.o.r. makers' works; exports, 6¾d. to 6⅞d. per gal., according to grade. MANCHESTER: 5¼d. to 6¼d. GLASGOW: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5¾d. to 6¼d.
CRESYLIC ACID.—97/99%, 4s. 7d. to 4s. 10d.; 99/100%, 4s. 10d. to 5s. 1d. per gal., according to specification; Pale, 98/100%, 4s. 10d. per gal.; Dark, 95%, 4s. 4d. to 4s. 6d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 4s. 3d. to 4s. 6d. MANCHESTER: Pale, 99/100%, 4s. 11d.
NAPHTHA.—Solvent, 90/160%, 1s. 8d. to 1s. 9d. per gal., naked at works; heavy 90/190%, 1s. 2d. to 1s. 3d. per gal., naked at works, according to quantity. GLASGOW: Crude, 6½d. to 7¼d. per gal.; 90% 160, 1s. 5d. to 1s. 6d., 90% 190, 1s. 1d. to 1s. 3d.
NAPHTHALENE.—Crude, whizzed or hot pressed, £9 to £9 10s. per ton; purified crystals, £18 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 10s. to £7 per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £20 per ton f.o.b.
PITCH.—Medium, soft, 39s. per ton, f.o.b. MANCHESTER: 37s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.
PYRIDINE.—90/140%, 12s. 6d. per gal.; 90/160%, 11s. per gal.; 90/180%, 5s. per gal., f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 11s. to 12s. per gal.
TOLUOL.—90%, 2s. per gal.; pure, 2s. 5d. GLASGOW: 90%, 120, 1s. 10d. to 2s. per gal.
XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. to 2s. 6d. according to quantity. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £8 to £8 10s. per ton; grey, £10 10s. to £11 10s. Liquor, brown, 30° Tw., 6d. to 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.
CHARCOAL.—£6 10s. to £12 per ton, according to grade and locality.
METHYL ACETONE.—40-50%, £42 to £45 per ton.
WOOD CREOSOTE.—Unrefined 6d. to 9d. per gal., according to boiling range.
WOOD, NAPHTHA, MISCIBLE.—2s. 8d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.
WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZIDINE, HCl.—2s. 5d. per lb., 100% as base, in casks.
BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-CRESOL, 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE, SOLID.—£72 per ton.
DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 10d.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works
GAMMA ACID.—Spot, 4s. per lb. 100% d/d buyer's works.
H ACID.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
NAPHTHIONIC ACID.—1s. 8d. per lb.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—9½d. to 9⅝d. per lb.; flake, 9½d. to 9⅝d.
a-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d. in casks.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.
NEVILLE AND WINTHER'S ACID.—Spot, 3s. per lb. 100%.
o-NITRANILINE.—3s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. to 2s. 1d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb., 100% d/d buyer's works.
SULPHANILIC ACID.—Spot, 8d. per lb. 100%, d/d buyer's works.
o-TOLUIDINE.—10½d. per lb., in 8/10-cwt. drums, drums extra.
p-TOLUIDINE.—1s. 10½d. per lb., in casks.
m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Latest Oil Prices

LONDON, Sept. 29.—LINSEED OIL was quiet. Spot, £32 5s. per ton (small quantities); Oct. to Dec., £29 17s. 6d.; Jan.-April £29 12s. 6d.; May-Aug., £29 10s.; Sept.-Oct., £29 12s. 6d., naked. SOYA BEAN OIL was firm. Oriental, spot, ex tank Rotterdam, £23 5s. per ton. RAPE OIL was quiet. Crude, extracted, £37 per ton; technical, refined, £38, naked, ex wharf. COTTON OIL was dull. Egyptian, crude, £22 per ton; refined common edible, £25; deodorised, £27, naked, ex mill (small lots, £1 10s. extra). TURPENTINE was dearer. American, spot, 33s. 6d. per cwt.
HULL.—LINSEED OIL, spot, quoted £30 12s. 6d. per ton; Sept., £30 2s. 6d. Oct. and Nov.-Dec., £30; Jan.-April, and May-Aug., £29 12s. 6d. COTTON OIL, Egyptian, crude, spot, £21; edible refined, spot, £24; technical, spot, £24; deodorised, £26, naked. PALM KERNEL OIL, crude, f.m.q., spot, £23, naked. GROUNDNUT OIL, extracted, spot, £30; deodorised, £33. RAPE OIL, extracted, spot, £36; refined, £37. SOYA OIL, extracted, spot, £29 10s.; deodorised, £32 10s. per ton. COD OIL, f.o.r. or f.a.s., 27s. 6d. per cwt., in barrels. CASTOR OIL, pharmaceutical, 46s. 6d.; first, 41s. 6d.; second, 39s. 6d. TURPENTINE, American, spot, 35s. 6d. per cwt.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Bankruptcy Proceedings

WESLEY CLARKSON and REGINALD WESLEY CLARKSON, 163 Burley Road, Leeds, and lately carrying on business together in co-partnership under the style of Clarkson and Co., 7 Brunel Street, Armley Road, Leeds. (B.P. 2/10/37.) Soap manufacturers. When these debtors attended at the County Court House, Albion Place, Leeds, recently, for further examination, a further investigation was ordered, and the proceedings were again adjourned. The joint statement of affairs filed showed ranking liabilities of £307 15s. 6d., and no assets, and the failure was attributed to lack of capital and heavy expenses.

Forthcoming Events

October 4.—Society of Chemical Industry (London Section), at Burlington House, Piccadilly, W.1, at 8 p.m. Dr. H. M. Wüest, "A Hundred Years of the Alkaloid Industry."

October 5.—British Association of Refrigeration at the Royal Society, Burlington House, Piccadilly, W.1, at 6.30 p.m. Dr. Ezer Griffiths, F.R.S., presidential address. Symposium on "Automatic Control Appliances." Electrodepositors' Technical Society at the James Watt Memorial Institute, Great Charles Street, Birmingham, 3, at 7.30 p.m. L. Mable, "Synthetic and Natural Abrasives." Hull Chemical and Engineering Society at Hull Photographic Society's Rooms, Grey Street, Park Street, Hull, at 7.45 p.m. Presidential address, "Colour."

October 6.—Meeting of the Society of Public Analysts at Burlington House, Piccadilly, W.1, at 8 p.m. The Pharmaceutical Society of Great Britain. Opening of the 96th Session of the School and the presentation of prizes at 3 p.m. Sir Humphry Rolleston, G.C.V.O., K.C.B., inaugural sessional address.

October 7-9.—National Safety Congress. Park Lane Hotel, London.

October 8.—Institute of Chemistry (Newcastle-upon-Tyne and N.E. Coast Section), Institution of Chemical Engineers, Society of Chemical Industry, and Coke Oven Managers' Association, at Armstrong College, Newcastle-upon-Tyne, at 7.45 p.m. Dr. P. O. Rosin, "Influence of Particle Size in Processes of Fuel Technology. Society of Chemical Industry (Bristol Section), at Bristol University at 7.30 p.m. A. E. Wallis, F.I.C., "Recent Developments in the Study of Nickel and other Carbonyls."

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Egypt.—The Commercial Secretary to H.M. Embassy in Egypt reports that the Egyptian Ministry of Education is calling for tenders for the supply, during the School Year 1937/1938, of chemicals, reagents and metal powders, filings, foils, etc. Tenders will be received up to November 2, 1937. A copy of the schedule of requirements and general conditions of tender may be inspected at the Department of Overseas Trade, 35 Old Queen Street, London, S.W.1. (Ref. T.Y.19876/1937.)

Brazil.—An agent in Rio de Janeiro desires to obtain the representation, on a commission basis, of United Kingdom exporters of chemicals. (Ref. No. 217.)

New Companies Registered

Industrial Lacquers, Ltd.—Registered September 24. Capital £500 in 500 shares of £1 each. To carry on the business of manufacturers of and dealers in cellulose lacquers, and cellulose products and paints of all kinds. Subscribers: Walter E. Wolff, 1 and 2 Finsbury Square, E.C.2; solicitor: J. L. Magnus.

Hydro-Plastics, Ltd.—Registered September 15. Nominal capital £21,000 in 20,000 ordinary shares of £1 each and 20,000 deferred shares of 1s. each. To acquire and develop patents relating to the emulsification of synthetic resigns; to carry on the business of manufacturers of and dealers in plastics, moulding materials, resins, solvents, etc. Subscribers: Ernest W. Rosier, 1 Greenhurst Road, West Norwood, S.E.27; and Charles C. Rose.

Enfield Chemicals, Ltd.—Registered September 15. Capital £10,000 in 9,900 ordinary shares of £1 and 2,000 founders of 1s. To carry on the business of manufacturers of and wholesale and retail dealers in coals, tar products, petroleum products, solvents of all kinds and wood distillates, chemical manufacturers, etc. Directors: Oscar T. McKernan, 6 Braeside, Blackburn; Leslie C. Binnington; Paul F. Matthews; and Walter Watson.

Company News

Newton, Chambers and Co. have announced an interim dividend on ordinary and preference shares of 5 per cent., less tax (same).

Unione Chemique Belge has given notice of its intention to redeem on April 1, 1938, the outstanding bonds of the 5½ per cent. loan of 1930. There are 2,193 bonds of fl.400 each outstanding out of an original issue of fl.15,000,000.

Burmah Oil Co. announces that the interim dividend on the £9,157,675 ordinary stock of the company will probably be announced on September 30. The 1936 interim was raised 1¼ per cent. to 5 per cent., and was followed by a final of 17½ per cent. and a bonus of 5 per cent., making 27½ per cent., against 20 per cent.

J. and J. Colman, Ltd., starch manufacturers, has maintained the interim dividend on the £2,007,012 ordinary shares at 5 per cent., actual, less tax, payable on November 1. For the past two years similar interims have been followed by finals of 10 per cent., and bonuses of 1 per cent., making total payments of 16 per cent., less tax.

United Premier Oil and Cake Co. have announced an interim dividend of 5 per cent. (or 3d. per share) on the ordinary shares of 5s. each, payable October 15 next. This compares with 4 per cent. paid at this time last year. Total dividend for 1936 was 12½ per cent., including a bonus of 2½ per cent. In 1935 the total payment was 10 per cent., and a capital bonus of 5 per cent.

Associated Portland Cement Manufacturers, and its subsidiary, British Portland Cement Manufacturers, have announced unchanged interims. Both companies are paying on September 30 7½ per cent. on their ordinary stocks in respect of the current year. Last year the Associated company maintained its final at 15 per cent., but the British company increased in final payment from 12½ per cent. to 15 per cent.

United Steel Companies has raised its total payment for 1936-37 on the increased capital by 1 per cent. The directors recommend a final dividend of 6 per cent., making, with the interim of 2½ per cent., a distribution of 8½ per cent., less tax, which is payable on £8,821,820 of stock outstanding, following the issue in May last year. This is the highest payment to be made by the company since its formation in 1930.

Explosives and Chemical Products report a net profit for the year ended June 30, after providing for depreciation, taxation, remuneration of directors and reserve for general purposes, amounting to £18,362 (£16,210); add £36,940 brought in, making £55,302. Dividend on ordinary shares of 16¾ per cent., tax free (same); dividend on deferred of 6.0717d. (5.99203d.) per share, tax free; forward £45,129. Meeting, Finsbury Pavement House, E.C.2, October 6.

Coal Conversion, in its report for the year ended December 31, 1936, reports that the business of the company is being conducted on a profitable basis. Accounts show debit balance on trading (after crediting £310 in respect of previous years) of £686 (£2,381); add audit fee £32, and patent renewals £101, total £813. After crediting transfer fees £19, and loan interest £125, there remains debit of £669, which has been transferred to special reserve.

Thos. Firth and John Brown and Co., manufacturers of special heat and acid resisting steels, etc. The directors have declared a dividend of 6 per cent., actual, tax free, payable on October 14 to shareholders registered in the company's books on October 2. This compares with 5 per cent. at this time last year, which was followed by a final of 10 per cent., making a total payment of 15 per cent., tax free, for 1936, or 2½ per cent. more than for the previous year.

The Staveley Coal and Iron Co., Ltd., held their 74th annual general meeting of the company on Wednesday. A salient point of the speech made by Sir William Bird, chairman of the company, was the immense strength of the company's balance sheet. He said that since the assets were valued in 1929 they had spent no less than £1,450,517 on improvements, without making any increase in capital. There had been an extraneous profit in the past year's accounts owing to the distribution of accumulated colliery profits, which had not been assigned to the merger company, but which had not been actually earned during the past financial year. But there is to be another windfall in this year's accounts, when the capital profit on the sale of Markham & Co., to John Brown & Co., will be brought into account. Among the proposals for the future which Sir William foreshadowed is a scheme for granting paid holidays to the Staveley company's coal miners.

Books Received

The Fine Structure of Matter. By C. H. Douglas Clark. Pp. 216. London: Chapman and Hall. 15s.

Organic Chemistry. By Frank C. Whitmore. Pp. 1080. London: Chapman and Hall. 40s.

Industrial Chemistry. By Emil Raymond Riegel. Third Edition. Pp. 851. New York: Reinhold Publishing Corporation. 28s. 6d.